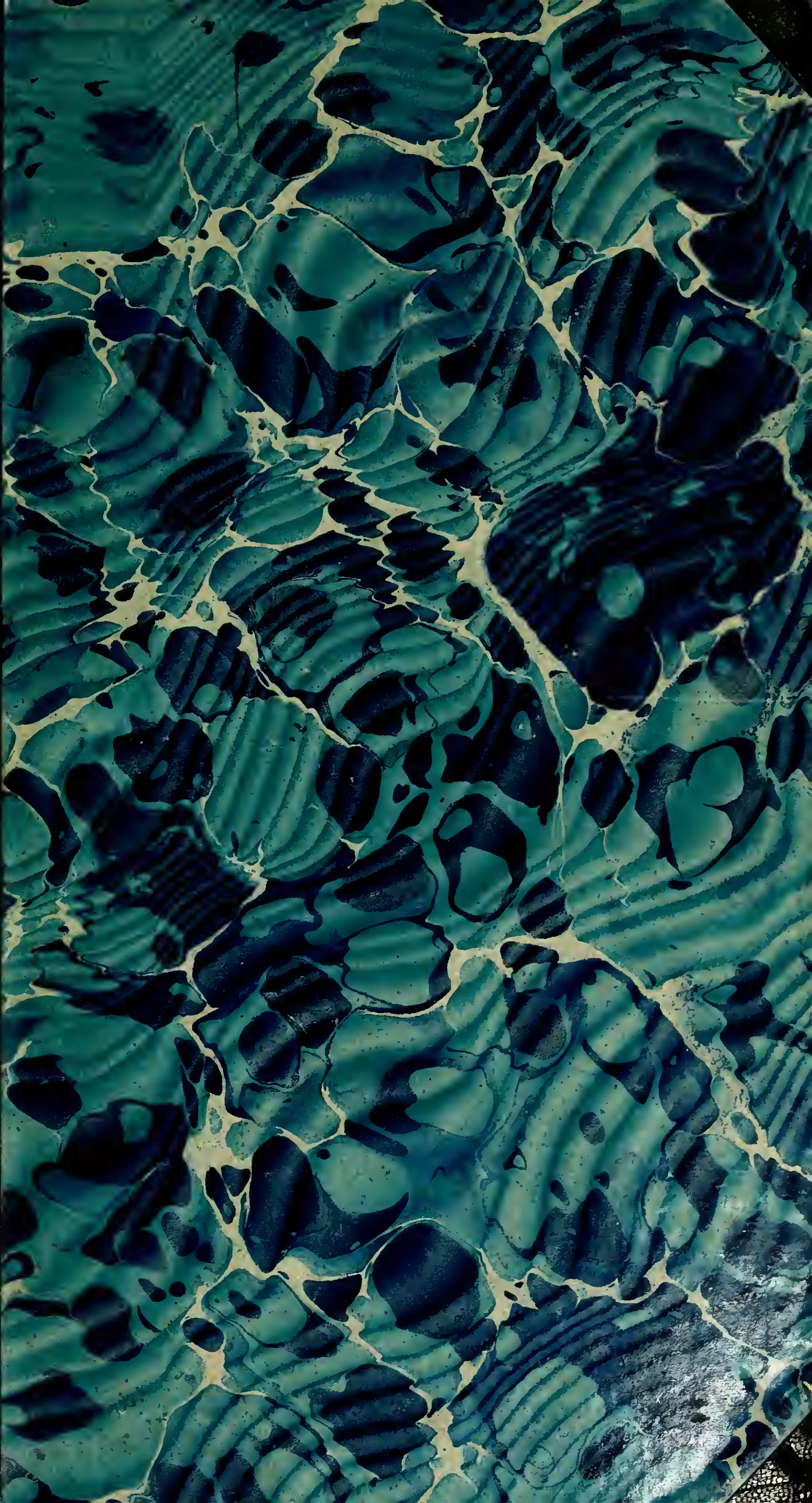


Digitized by the Internet Archive
in 2010 with funding from
CARLI: Consortium of Academic and Research Libraries in Illinois

http://www.archive.org/details/annualreportofboar08chic

EIGHTH ANNUAL REPORT

OF THE

BOARD OF PUBLIC WORKS,

TO THE

COMMON COUNCIL

OF THE

CITY OF CHICAGO,

FOR THE

MUNICIPAL FISCAL YEAR ENDING MARCH 31st, 1869.

CHICAGO:
PRESS OF JAMESON & MORSE, 12 & 14 LA SALLE STREET.
1869.

BOARD OF PUBLIC WORKS.

MEMBERS OF THE BOARD.

A. H. BURLEY, Commissioner and President.

JOHN McARTHUR, Commissioner and Treasurer.

W. H. CARTER, Commissioner.

WILLIAM GOODING, } Members acting only in Matters pertaining to Cleansing Chicago River.
ROSWELL B. MASON,

OFFICERS.

A. W. TINKHAM, Secretary.

E. S. CHESBROUGH, City Engineer.

COMMISSIONERS' REPORT.

Office of the Board of Public Works,
Chicago, October 1st, 1869.

To the Mayor and Aldermen of the City of Chicago, in Common Council assembled:

The Board of Public Works submit herewith the report of their doings in the several departments of public work entrusted to their supervision, for the fiscal year ending March 31st, 1869.

The year has been one of great activity in all these various departments, and of marked advance in all public improvements. It is particularly memorable as the year when was completed and brought into use the first tunnel under the river—Washington Street Tunnel. The river with its branches divides the city into three distinct parts. All interruption of communication between these natural divisions tends to isolation. Nothing will so much contribute to secure that unity of feeling and interest which is essential to the prosperity of the city as reliable and convenient means for intercourse between them. It is hoped that this experimental tunnel will be found a sure and convenient method for travel to pass the river, and that it will afford an adequate relief from the interruptions and annoyances—ever growing with the commerce of the city—caused by the turning of the bridges for the passage of vessels.

The Board report on the various departments of work in the same order as in previous reports.

WATER WORKS.

CONDITION OF WORKS GENERALLY.

With a trifling exception, alluded to in the report of the City Engineer, the supply of water to the city has been uninterrupted during the year. The Lake Tunnel has supplied all the water used, and has remained apparently undisturbed and uninjured. The quality of the water has been always good. With the extreme heat of summer, the use and waste of water became so excessive that it was impossible to furnish an adequate supply to the parts of the city more distant from the works. The Board were then obliged to give public notice that their rules forbidding such waste would be strictly enforced. With this exception, the supply has been so maintained that there has been no general complaint. As is remarked more fully hereafter, the necessary supply for the city has become so large that it fully equals what may be considered as a safe measure of the pumping capacity of the works, making proper allowance for their liability to accident.

NEED OF NEW ENGINES.

In the last annual report, as in several special reports, the Board have urged upon the attention of your honorable body the necessity of erecting at once additional engines. The experience of the past year shows that their construction cannot be entered upon too soon. The rapid growth of the city for years, and the consequent extensive additions to the water mains, with other causes, have caused a large increase, year by year, of the amount of water consumed, until now the maximum amount pumped on some days fully equals if it does not exceed what the works can be safely relied upon to supply.

The average daily amount pumped for the year was 14,725,000 gallons—an increase of about 27 per cent. over the daily average for the year preceding. The greatest amount pumped in one day was 19,623,037 gallons.

As remarked in the report of the Engineer, the rate of gain in the amount of water required for the supply of the city has been such for several years that the daily supply for the year ending March 31st, 1870, will not be likely to be less than 20,000,000 gallons, reaching, with the extreme days of winter and summer, a much greater amount.

The daily average supply of Boston for the year 1868 was 14,769,167 gallons, corresponding almost exactly with Chicago.

NEW ENGINE HOUSE.

During the year, the well curb for the pumping well for the south wing of the Engine House was sunk into its place, and the south wing with the south boiler room completed. This additional pumping well is circular, was constructed above ground, and subsequently sunk to its place in like manner with the north well, and in general corresponds with it in its manner and plan of construction, except that it is somewhat larger. It is all ready for receiving the foundation of a new engine.

The grounds surrounding the pumping works are yet to be properly fenced and ornamented. It is in contemplation to somewhat extend them by filling up a portion of the basin, enclosed by the old and decayed crib work.

The new works, it is believed, are hardly equalled anywhere for commodiousness and beauty.

WATER PIPES.

The amount of water pipes laid last year was very great—more than in any previous year. The new districts supplied would of themselves constitute a respectably sized city. As laid in the three divisions, the amounts are as follows:

In the South Division	55,850	feet.
“ “ West “	81,675	“
“ “ North “	23,558	“
Total	161,083	feet,

or 30 miles and 2,683 feet.

There are now laid in the city, of mains of all sizes, 208 miles and 3,117 feet. This extent of pipes laid exceeds that of any other city in our country, excepting New York, Brooklyn and Philadelphia.

One principal cause of the lack of supply to certain portions of the city is, that the supply mains are not large enough, and not enough extended. This defect the Board have planned to remedy by a system of mains, making circuit of the three divisions of the city.

Commencing at the pumping works, it is proposed to have a continuous circuit of two feet mains by the following route:

On Pine street to Chicago river.
On River street and Wabash avenue, from Chicago river to Twenty-second street. } Already laid.

On Wabash avenue, from Twenty-second street to Thirty-first street.

On Thirty-first street, from Wabash avenue to Main street.

On Main street to South branch Chicago river.

On Throop street, from river to Twenty-second street.

On Twenty-second street, from Throop street to Reuben street.

On Reuben street, from Twenty-second street to Division street.

On Division street, from Reuben street to Crosby street.

On Crosby street, from Division street to opposite Oak street.

On Oak street (and alley) from Crosby street to Rush street.

On Rush street, from Oak street to Pearson street.

On Pearson street, from Rush street to the pumping works; making a continuous main of two feet diameter, of about thirteen miles in length. A considerable portion of this will be laid during the present calendar year.

Across the nearly rectangular space enclosed by this circuit of mains, will be laid other and smaller mains, connecting with the system of main and distribution pipes as already laid.

On West Chicago avenue, the sixteen inch main will be extended west to Reuben street.

On Harrison street, it is proposed to lay a twelve inch main, from Desplaines street to Reuben street.

On Twelfth street, the sixteen inch mains will be extended west to Reuben street.

On Green street, between Harrison and Monroe streets, and on Lytle street, between Harrison and Twelfth streets, twelve inch mains are proposed.

The particular route of the circuit and connecting mains may be somewhat modified in carrying the plan into execution.

Notwithstanding the very large amount of pipes laid during the year now reported on, the demand for the laying of more pipes continues unabated. Apparently as much will be required during the present year as in the last.

FIRE HYDRANTS.

One hundred and fifty-one new hydrants were erected during the year, making the total number now connected with the works 1,070.

TAPPING OF THE WATER PIPES.

The water pipes are drilled (or tapped) by employes of the Board. The city also furnishes the cast-iron boxes used for protecting the taps at the pipes, and at the sidewalk, to indicate the location of the stop-cock. For this service, a charge is made to cover the cost to the city. The plumbing is all done by licensed plumbers, at the expense of parties introducing the water. A very large number of taps was inserted during the year, consisting of the following sizes, viz:

1 inch	110
¾ "	138
⅝ "	1,582
½ "	2,838
Total number	4,668

WATER RATES COLLECTED.

The total income received from water rents and taxes during the year ending March 31st, 1869, amounted to $420,686.94.

WATER METERS.

The Board have found the use of meters in establishments using large quantities of water, both satisfactory to consumers and profitable to the city. The only ones in use are the Worthington meters. One hundred and fifty-four new meters were added during the year, making the whole number belonging to the water works four hundred and twenty-nine, of which number four hundred are in use.

The numbers on hand, of each size, are given below:

⅝ inch Meters	78
1 " "	154
1½ " "	65
2 " "	79
3 " "	49
4 " "	4
Total number of meters	429

The whole amount of water pumped during the year was 5,374,624,576 gallons, for all purposes. The amount measured and paid for by meters, was 507,615,500 gallons. The revenue from the use of water passing through the meters, amounted to $76,525.26. The average tax received for a thousand gallons, was $15\frac{1}{13}$ cents.

It is not the practice of the Board to attach meters to dwelling houses.

An experiment of some interest was, however, made by connecting meters, in several instances, to blocks of dwelling houses, generally without baths or water closets, or other extra attachments. The object was to ascertain how far the amount of water actually used agreed with the assessment levied for the same. The results are given below:

Block of 8 dwellings, without extras, one year's assessment	$ 80.00
Charge for same if rated by meter, at two cents ₱ 100 gals.	186.00
Block of 12 houses, without extras, eight months' assessment	121.00
Charge by meter for same, for eight months	168.00
Block of 9 houses, 3 of which had each one bath and one water closet, ten months' assessment	102.00
Meter charge for ten months	156.48

It has been remarked that the daily average consumption of water last year agreed very nearly with that of Boston. A comparison of the water rates received in the two cities will not be without interest. Below we give such a statement:

Total income from water rates in 1868, Boston	$553,744.88
Same for year ending March 31st, 1869, Chicago	420,686.94

INTEREST, EXPENSES AND SURPLUS REVENUE.

Expenses at Pumping Works	$64,727.37
Lake Tunnel—Salary of Keeper at Crib, Repairs of Crib, use of Tugs, &c	5,212.29

Repairs of Pipes, Hydrants, &c., and miscellaneous operating expenses	34,413.60
Water Meters, repairs, depreciation and operating expenses	3,051.89
Salaries of Board and Officers, office rent and expenses, and all salaries and expenses pertaining to the Water Office, and the assessment and collection of water rents	30,527.73
Interest on Water Loan Bonds, including $3,999.36 transferred from discount account	171,761.62
Total interest and operating expenses	$309,694.50

Income from Water Rates, as stated above	$420,686.94
Deduct interest and expenses	309,694.50
Surplus Revenue	$110,992.44

COST OF ADDITIONS TO THE WORKS DURING THE YEAR.

$30\frac{2683}{5280}$ miles of Water Pipes laid, including expenditure on Tunnel, for water main at Twelfth Street	$266,961.35
New Engines, balance in full to contractors	1,212.16
New Pumping Well, South wing of Engine House	16,749.42
New Engine House	35,279.27
Water Works Tower	929.62
Temporary connection with Lake Tunnel	1,421.40
New Inlet, connecting shaft of Lake Tunnel and Engine House	6,113.22
New Machine Shops and fixtures for same	5,617.41
Surveys, &c., for Extension of Lake Tunnel to West Division	1,187.80
	$335,471.65

COST OF THE WORKS, APRIL 1st, 1869.

Cost of the Water Works, including all expenditures on works in progress, March 31st, 1869...	$3,146,383.14

MEANS BY WHICH WORKS WERE PAID FOR.

Water Loan Bonds, six per cent., $1,030,000.00, deducting for discount, $42,638.10............	$ 987,361.90
Water Loan Bonds, seven per cent..............	1,690,000.00
Balance from Water Rents.....................	469,021.24
	$3,146,383.14

SEWERAGE WORKS.

Chicago is peculiarly fortunate in having a *system* of sewers. In most cities it has been the practice to construct individual sewers from time to time, according to the want of the particular street or district to be drained, and without any general plan for the drainage of the entire city. In after years, as it became necessary to use them as general sewers, they have often been found inadequate as to capacity, or useless from being at unsuitable grades and elevation. In Chicago, each sewer is a link in the system, and designed to fulfill its work as a part of the whole. The change or re-laying of a permanent sewer has never yet been necessary.

The sewerage system has continued to work efficiently, as has been heretofore reported.

The demand for the laying of new sewers was, as usual, very great. The want of means, however, necessarily limited very much the length laid during the year. For about one-tenth of that put down, the money was advanced by private parties, to be refunded subsequently. The total amounts laid in the three divisions, and the cost for each division, are as stated below :

LENGTH AND COST OF SEWERS LAID DURING THE YEAR.

South Division,	8,597	feet	$ 42,396.01
West “	27,736	“	105,009.20
North “	11,508	“	49,747.71

Total........ 47,841 feet, or $9\frac{321}{5280}$ miles, costing..$197,152.92

Of the above amount, some two miles were made necessary by the laying down of new pavements. The total length of sewers laid in the city, March 31st, 1869, was $110\frac{1491}{5280}$ miles.

SEWER CLEANING.

Notwithstanding the increased length of sewers, as compared with the previous year, the cost of the cleaning of the sewers for the two years corresponded almost exactly.

Cost of cleaning Sewers and Catch Basins during the year	$26,954.06

SEWER REPAIRS.

Cost of the repairs of Sewers and Catch Basins, and of the renewal and repairs of manholè covers during the year	$11,287.08

PRIVATE DRAINS CONNECTING WITH PUBLIC SEWERS.

It is the aim of the Board to require that all lots on the line of a proposed pavement shall be supplied with drains, as also with water and gas service pipes, in advance of the laying of the pavement. Most of these drains and water pipes are laid by the city, and an assessment levied for their cost. The statement below accordingly includes many permits for drains, the charge for which will be collected by the city when the assessments are paid.

PERMITS ISSUED.

South Division	776	
West "	1,419	
North "	1,066	
Total	3,261	
Total receipts from permits		$11,208.10

SEWERAGE EXPENSES, REPAIRS AND INTEREST.

Interest on sewerage loan bonds and temporary loans	$126,349.51
Sewerage sinking fund, amount set aside, tax of 1868	28,878.82
Salaries, office rent, and office and miscellaneous expenses	18,273.55
Repairs and cleaning of sewers as above	38,241.14
Total cost for the year	$211,743.02

SEWERAGE LOAN BONDS.

Six per cent. bonds outstanding March 31st, 1869	$ 87.000.00
Seven " " " " " "	1,753,000.00
Total of sewerage bonds March 31st, 1869	$1,840,000.00

SEWERAGE SINKING FUND.

The condition of the fund April 1st, 1869, was as follows:

Balance in hands of City Treasurer	$32,938.47
Due from the sewerage tax of 1868	31,069.20
Mortgage due and unpaid	5,922.10
Total not yet applied to canceling of sewerage bonds	$69,929.77

No bonds were canceled during last year. The total amount purchased and canceled remains as then reported, $160,000.00.

The mortgage referred to is in process of foreclosure.

DEEPENING OF THE ILLINOIS AND MICHIGAN CANAL.

The report for the previous year spoke of the work on the Canal as being all under contract, excepting on secs. 17–44, inclusive. These sections were advertised to be let early in the season, but, from various causes, it was not till the close of the summer that they were all under contract. The contractors for these specified sections are as follows, viz:

Secs. 17–19, Hugh Maher.
" 20–26, Fox, Howard & Walker.
" 27–32, Jno. J. Parry.
" 33–37, Carkin & Kimball.
" 38–39, Barnard & Gowen.
" 40–44, Fox, Howard & Walker.

The contracts for this new letting require that the work shall be wholly completed March 31st, 1871, and stipulate that if the progress made is such as to require it, such a force of men, teams, &c., shall be put at work during the suspension of navigation as will ensure the completion at the stipulated time. The Board are using every exertion to bring this important work to a close, so that its sanitary and commercial benefits may be realized by the city as early as the time set in the contracts. One incidental benefit resulting from the deepening of the canal will be the largely increased value to lands bordering upon it and drained by its deepening.

By the terms of the original grant from the Canal Trustees, authorizing the city to enter upon the canal for its deepening, the time for the doing of the work was restricted to three years.

This time having elapsed, an extension, for an additional term of three years, was asked for by the Board, and was granted.

A larger amount of work was done during the year than in any previous year. At the request of the Board, navigation was suspended on the canal and the water drained off, November 1st, to permit the rock contractors to commence work. During the winter, the rock sections—sections 45–64—were nearly completed. A large amount of machinery is now in operation on the remaining sections, termed the earth sections.

Below we give an exhibit of the amount of material removed during the year:

Earth excavation	390,234	cubic	yards.
Rock "	138,601	"	"
Rip-rap wall,	3,294	"	"
Retaining wall,	314	"	"

During the summer, the Pumping Works at Bridgeport were employed as became necessary, and the main and South Branch river thus maintained without offensiveness through the season.

The Board having disagreed with the Canal Trustees, as to the proportionate part of the expense of pumping for the previous year properly chargeable to the city, the question was finally settled by arbitration, Hon. John M. Wilson being the arbitrator. The amounts paid for pumping that year and the last, are stated herewith:

COST OF PUMPING AT BRIDGEPORT FOR CLEANSING CHICAGO RIVER.

Summer of 1867	$17,875.21
" " 1868	11,178.88

CHICAGO HARBOR.

The frequent grounding of vessels in many parts of the river, made it apparent that there were many shallow spots requiring deepening. Accordingly, early in the season, proposals were invited for doing what dredging should be found necessary by the Board in the river, and a contract made with Messrs. Fox & Howard, at the rates of forty-two cents a cubic yard for dredging done between the mouth of the river and Twelfth street and Chicago avenue, and sixty-nine cents a yard for material removed above those two streets. A large amount of dredging was required under this contract, costing altogether, during the year, $63,559.07.

A channel was also opened in the South fork of the South Branch, from the canal locks to the grounds of the Rolling Mills, paid for in part by a special assessment levied several years before. This channel was nearly, but not quite, completed in the summer and fall of 1868. The expenditure to the close of the fiscal year was $13,338.33.

No work has been found necessary at the mouth of the harbor, the previous extension of the pier and dredging by the United States Government having been found adequate for the maintenance of the channel over the bar.

WASHINGTON STREET TUNNEL.

The work on the tunnel under the river at Washington Street was prosecuted vigorously throughout the year by the contractors, Messrs. J. K. Lake, Charles B. Farwell and A. A. McDonnell. The short time in which the west half of the river portion of the tunnel was completed, affords an instance of the energy with which the work was carried forward. Notice was given by the contractors, that on October 28th, 1868, they would commence the construction of the coffer-dam. On new years' day succeeding, a little more than two months after—the work was substantially completed, and the event was formally celebrated by the passage of a procession through the tunnel, of the city authorities with others, and subsequently of the citizens generally.

While the west half of that part of the tunnel beneath the river was in progress, a leak manifested itself in the masonry of the east half, which caused considerable anxiety for awhile. It was apparently caused by some slight movement in the masonry before the two parts were brought together. Measures have been taken to close it up, which it is believed will be successful, and in fact it has so much lessened as to be hardly noticeable on the walls and upper arch, unless, perhaps, in winter.

The steady throng of pedestrians and vehicles through the tunnel, gives the best possible testimony to its utility. In the ease with which the passage under the river is made by pedestrians, and by all except very heavily loaded teams, it more than answers all that was anticipated of it.

An interesting trial was made soon after the celebration spoken of above, the object being to ascertain what loads could be conveniently drawn up the grades of the tunnel—and to prescribe limits to such, if it was found necessary. The trial took place January 26th, 1869, and the results are given below.

The passage through was from West to East, the teams entering at Clinton Street in the West Division, and coming out at Franklin Street in the South Division. The teams were all two horse teams, and the vehicles four wheeled trucks.

The descent from Clinton Street to the bottom of the tunnel, is 43.75 feet, and the declivity 1 foot in 18.6265. The ascent from the bottom of the tunnel, to the eastern extremity of the approach at Franklin Street, is 41.77 feet, and the declivity 1 foot in 16.

This last grade, it should be remarked, is regarded by the Board as steeper than is desirable.

The distance through, from the top of the western approach to the top of the eastern, is 1608 feet.

First Truck—Weight of team, 2600 lbs., weight of truck, 2840 lbs.
" " load, 3605 "
—— 6445 lbs.

Second Truck—Weight of team, 2500 lbs., weight of truck, 2800 lbs.
" " load, 3700 "
—— 6500 lbs.

Third Truck—Weight of team, 2500 lbs., weight of truck, 3200 lbs.
" " load, 4080 "
—— 7280 lbs.

Fourth Truck—Weight of team, 3000 lbs., weight of truck, 3485 lbs.
" " load, 5200 "
—— 8685 lbs.

Fifth Truck—Weight of team, 2600 lbs., weight of truck, 2800 lbs.
" " load, 6365 "
—— 9165 lbs.

The trial, it will be observed, took place in winter, the roadway of the open approaches being somewhat snowy and slippery. All of the teams passed through without stopping. All but the last pulled up the ascent with ease; the last team with difficulty. Its gross load of over four and one-half tons, was apparently about the measure of its strength.

In the appended report of the City Engineer will be found a full description of this interesting work, with engravings illustrating its manner of construction.

Late in the year the City Engineer was instructed to visit New York and other places at the East, for the purpose of getting information for use in planning for a tunnel under the main river, connecting the South and North Divisions. One object was to get any information to be had concerning iron tunnels. The conclusion arrived at was, that the experience of Chicago fully equals that of other cities as to the best manner of constructing tunnels.

STREET WORK.

The experience of the preceding year had demonstrated that the cleaning of the paved streets of the city could be done more cheaply and effectively by contract than by day labor. It was believed, also, that the work could be more advantageously let for a term of three years than for one year. Proposals for doing the work for one year, and also for three years, were therefore obtained, and a report of the same at the time made to your honorable body. It was not, however, until late in the season, that the Board received authority to let the work, after again advertising for bids. The contract is now in the hands of Mr. John T. Salter, (represented by Mr. Levi P. Wright,) for the term of three years, commencing November 20th, 1868, and ending November 19th, 1871, for streets now improved, and for such as shall be improved during the time of the contract. The price to be paid is $1,972.50 per mile for one year's cleaning. The contractor is doing his work energetically and satisfactorily.

The street pavements put down last year were all wooden block pavements, as has been the practice for several years. About six miles of streets were thus paved. The particular mode of laying the pavement corresponded generally with that described in the report of the year previous.

A new style of pavement was, however, introduced on several of the streets, termed the Boyington patent pavement. This pavement is the invention of Mr. W. W. Boyington, of this city, and its use on the streets for last year was granted by him without charge for the patent right.

STREETS PAVED WITH THE PATENT BOYINGTON PAVEMENT.

Franklin street, from South Water street to Madison street.
Twenty-second street, from State street to Kankakee avenue.
Michigan avenue, from South Water street to Lake street.

The peculiarities of this pavement are that one half of the rows of the three-inch blocks are *seven* inches deep, (instead of six, as usual,) resting on the ordinary flooring of inch boards, while the alternate rows of the usual depth of six inches rest on the center of strips of inch boards, five inches wide, placed crosswise of the flooring. These strips touch against the seven-inch rows, and are nailed to the flooring. There are thus formed between the six and seven-inch rows, cells six inches deep and one inch wide, extending across the street. As respects the gravel in the cells, and on the surface, and the use of tar, the pavement does not differ from the ordinary mode as described heretofore.

There are now in use in the city four different kinds of wooden block pavement, viz:

First. That termed the Nicolson, with which the earlier pavements were laid. The cells or spaces in this pavement are half-filled with a three-inch strip, or picket, and half with gravel and tar.

Second. The pavement now in general use. In this, the cells to the whole depth of six inches are filled with a composition of gravel and tar.

Third. The Boyington patent pavement, described above.

Fourth. The Converse wooden pavement. This differs from the others mainly in that the cells which, in the other modes, are occupied wholly or in part with gravel and tar, are here dispensed with, the space between the rows of blocks being occupied with strips of inch boards of the same height as the blocks, set up edgewise.

As is generally known, the improvements of the streets and alleys of the city are paid for by special assessments with such an appropriation from the general fund of the city as shall seem to accord with the benefits to result to private property and to the city at large. The following tabular statement is an exhibit of the large amount of work done in the special assessment department of the Board, including not only the street but other improvements, the cost of which is apportioned as stated above. In the main, this is a work of preparation for what is to be done in the ensuing year.

SPECIAL ASSESSMENT DEPARTMENT REPORT.

CHICAGO, April 1st, 1869.

MR. A. W. TINKHAM,
Secretary Board of Public Works.

SIR:—I present herewith a tabular statement showing in detail the assessment work that has been done in this department from April 1st, 1868, to April 1st, 1869, together with a summary of the street improvements provided for by assessment during the past year, and a statement of the special assessment business of the Board since 1861.

STATEMENT OF ASSESSMENTS FOR STREET OPENINGS & WIDENINGS.

No. of Warr'nt	NAME OF STREET.	FROM	TO	Amount of Assessment.
231	W. Monroe st	Leavitt st	Western av	$2,042 72
234	Seeley st	W. Jackson st	W. VanBuren st	891 95
313	Adams st	Its West'n terminus	Western av	11,506 96
320	North av	Milwaukee av	Western av	257 90
352	Michigan av	Douglas place	Egan av	16,468 36
380	Baldwin st	Present terminus	Hubbard st	795 00
394	Reuben st	South Western av	W. Madison st	6,350 00
397	Eugenie st	Easterly	N. Clark st	5,661 38
413	Oakley st	Madison st	Twelfth st	12,884 50
562	Dearborn st	Present terminus	Jackson st	190,341 83
563	Milwaukee av	Inter'n of Canal st.	With W. Lake st	114,612 00
594	W. Jackson st	Leavitt st	Hoyne st	10,825 65
381	Hart st	Present N. termin's	Hubbard st	1,579 05
544	W. Hinsdale st	East	N. La Salle st	1,893 27
	Total,			$376,110 57
	Amount to be paid by city from general fund on account of above,			7,124 92

STATEMENT OF ASSESSMENTS FOR ALLEY OPENINGS & WIDENINGS.

No. of Warr'nt		Amount of Assessment.
230	Alley, B. 2, Butler, Wright & Webster's add., extending W. to Kingsbury Street,..................................	$1,184 65
232	Widening Easterly part of Alley running E. & W. in S. part of Bl'k 40 O. T.,.......	180 89
233	Opening Alley, E. & W. through Bl'k 3, C. T., sub-division of W. ½ and W. ½ N. E. ¼ Sec. 17, T. 39, N. R. 14 E..	79 70
235	Opening Alley in Bl'k 1, Duncan's add., running N. & S. from Madison to Monroe st.,.........................	3,627 27
315	Extension of Alley running N. & S. through Bl'k 20, Rogers' sub-division of N. E. ¼ of S. E. ¼ Sec. 4, T. 39, N. R. 14 E.	1,126 24
322	Opening Alley running N. & S. from 24th to 25th sts. and between Kankakee and Calumet aves.,................	1,629 56
393	Extension of Alley in Bl'k 18, Rogers' sub-division of N. E. ¼ of S. E. ¼ Sec. 4, T. 39, N. R. 14 E.........	1,803 34
436	Opening Alley in Bl'k 10, Brand's add., between Halsted and Newberry sts.,.....	586 78
569	Opening Alley in Bl'k 18, Duncan's add., from W. Jackson to W. VanBuren st.,................................	5,400 45
591	Opening Alleys from 16th to 18th sts. and between Prairie and Indiana aves.,................................	7,007 22
	Opening Alley in Bl'k 21, Duncan's add., from W. VanBuren to W. Tyler sts.,..................................	5,341 05
	Total,.......	$27,967 15
	Amount to be paid by city from general fund on account of above,	322 32

STATEMENT OF ASSESSMENTS FOR WOODEN BLOCK PAVEMENT.

No. of Warr'nt	NAME OF STREET.	FROM	TO	Amount of Assessment.
237	Adams st	Michigan av	State st	6,818 70
316	N. Wells st	Kinzie st	Chicago av	7,898 62
317	Desplaines st	W. Van Buren st	Fourth st	122,113 90
2d 318	Van Buren st	Michigan av	State st	1,840 50
321	Michigan av	Lake st	S. Water st	3,825 66
346	Franklin st	S. Water st	Lake st	3,585 33
348	Twenty-second st	State st	Kankakee av	28,460 06
350	Franklin st	Randolph st	Madison st	10,613 15
351	N. Wells st	Kinzie st	Chicago av	52,867 91
353	Indiana av	Twenty-second st	Twenty-ninth st	47,772 96
354	W. Lake st	Halsted st	Reuben st	91,091 61
370	N. Clark st	Division st	North av	41,183 30
395	W. Adams st	Canal st	Halsted st	17,896 78
396	Sangamon st	Fulton st	W. Van Buren st	48,483 89
398	W. Adams st	Halsted st	Reuben st	59,064 14
411	Clinton st	Van Buren st	Madison st	42,742 34
412	Dearborn st	Chicago av	Division st	26,403 90
414	W. Madison st	Halsted st	Center av	51,046 11
415	Harmon Court	State st	Michigan av	8,287 56
437	Monroe st	Clark st	Market st	12,914 87
438	Jefferson st	Van Buren st	Randolph st	61,948 90
439	Adams st	State st	Market st	20,093 66
440	Pine st	Michigan st	Chicago av	20,660 30
442	N. Dearborn st	N. Water st	Chicago av	38,554 82
443	N. Wells st	Chicago av	Division st	50,438 92
444	Canal st	Twelfth st	Sixteenth st	56,902 63
486	Canal st	Madison st	Twelfth st	120,464 20
2d 532	N. Clark st	The River	Chicago av	8,967 31
537	Wabash av	Twenty-second st	Twenty-ninth st	50,873 93
538	Halsted st	C.B.&Q.R.R. cross.	Archer av	95,871 24
2d 539	Milwaukee av	Desplaines st	Elston Road	7,017 88
540	Twelfth st	State st	Chicago River	31,067 75
2d 541	Indiana av	Sixteenth st	Twenty-second st	2,020 48
542	Twelfth st	State st	Michigan av	6,274 23
543	W. Washington st	W. Water st	Elizabeth st	70,828 11
2d 545	Halsted st	Lake st	Harrison st	15,002 23
2d 547	N. Clark st	Chicago av	Division st	7,645 44
2d 548	Randolph st	Halsted st	W. Water st	3,235 75
2d 549	W. Van Buren st	Canal st	Halsted st	569 43
2d 550	Blue Island av	Harrison st	Twelfth st	7,604 61
552	Huron st	N. Clark st	N. State st	11,442 02
553	Eighteenth st	Wabash av	Chicago River	45,366 34
554	Division st	Clark st	Clybourne av	27,276 50
555	Madison st	State st	Chicago River	31,044 76
556	N. Dearborn st	Division st	North av	31,085 50
558	W. Kinzie st	Halsted st	Canal st	47,778 48
559	Ohio st	St. Clair st	Clark st	27,112 82
560	Randolph st	Michigan av	Randolph st. bridge	35,430 65
561	Polk st	State st	Chicago River	30,616 86
564	Archer av	State st	Canal or Slip	108,669 38
	Total			$1,756,776 42
	Amount to be paid by city from general fund on account of above,			351,579 75

STATEMENT OF ASSESSMENT FOR MISCELLANEOUS STREET AND ALLEY IMPROVEMENTS.

No. of Warr'nt	NAME OF STREET.	Amount of Assessment.
314	Gravelling Prairie av. from 32d st. to Cottage Grove av....	$7,271 10
323	Grading Fox place “ Elston road to Noble st........	81 72
347	Curbing Monroe st. “ Clark st. to Market st.........	571 85
349	Macadamizing S. Market st. from Madison to VanBuren st.	3,337 28
441	Graveling Michigan av. from 22d st. to 29th st.............	37,314 78
530	Curbing & Filling Jackson st. from Michigan av. to State st.	1,891 76
531	“ “ “ “ State st. to Market st...	22,159 78
2d 551	“ “ Division st. from Clybourne av. to Larrabee	824 07
557	“ “ Harrison st. “ State st. to Wells st.	12,701 26
572	Graveling Prairie av. from Cottage Grove av. to 29th st...	30,628 52
319	Planking Court place, Bl'k 42, O. T., Franklin to Market st.	1,572 70
324	“ Alley running N. & S. bet. 18th & 20th sts. and Michigan and Indiana aves..............................	3,266 62
382	Planking Alley, Bl'k 15, Fractional Sec. 15, addition.......	1,747 94
383	“ “ “ 3, “ “ 15, “	1,020 66
384	“ “ “ 7, “ “ 15, “	1,253 87
385	“ “ “ 22, “ “ 15, “	2,618 37
386	“ “ “ 14, “ “ 15, “	1,764 16
387	“ “ “ 6, “ “ 15, “	1,244 31
388	“ “ “ 10, “ “ 15, “	1,244 63
389	“ “ “ 18, “ “ 15, “	1,787 55
390	“ Calhoun place, Bl'k 55, Original Town..........	1,321 83
391	“ “ “ “ 54, “ “	1,903 75
392	“ “ “ “ 53, “ “	1,893 00
432	“ Alley, Bl'ks 13 & 18, C. T. Sub. S. E. ¼, Sec. 17,.	2,986 94
433	“ “ Bl'k 27, W. ½ & W. ½ N. E. ¼ Sec. 17,.	1,357 02
434	“ “ “ 24, Original Town....................	3,511 56
435	“ “ S. ½ Bl'k 52, Sec. 7......................	1,938 18
529	“ “ N. 198 5-10 ft. bet. Halsted & Newberry and Taylor and 12th sts..............................	1,237 63
533	Planking Alley, Bl'k 1, Ridgley's addition to Chicago... ..	1,914 20
534	“ “ S. ½ Bl'k 54, C. T., new sub'n of Blocks in N. W. ¼, Sec. 21, T- 39 N. R. 14 E.................	771 75
546	Planking Alley, bet. Taylor & Forquer sts. and Halsted st. and Blue Island av..................................	3,887 81
565	Paving Alley, running N. & S., Bl'k 5, Frac. Sec. 15 add'n.	2,628 83
566	Planking Alley from Randolph st. to Benton place, and bet. Wabash av. and State st............................	786 66
567	Planking Alley, Bl'k 8, Brainard & Evans' addition........	1,410 22
568	“ “ bet. Johnston & Newberry sts. and Taylor and 12th sts..	2,618 55
570	Planking Alley, Bl'ks 123 & 124 S. S., from VanBuren to Harrison and bet. Clark st. and Fourth av...............	4,291 20
571	Planking Alley, in E. part of Bl'k 26, Johnston, Roberts & Storrs' addition.....................................	462 77
	Total,.......................................	$169,224 83
	Amount to be paid by city from general fund on account of above,	11,292 02

STATEMENT OF ASSESSMENTS FOR ERECTION OF LAMP POSTS.

No. of Warr'nt	No. Posts	NAME OF STREET.	FROM	TO	Amount of Assessments.
275	1	Indiana st......	Rush st. and a point	120 ft. east thereof	36 00
276	17	Chicago av.....	Rucker st.........	Noble st..........	589 50
277	2	Clark st........	N. Water st.......	Chicago River.....	72 00
278	3	Reuben st......	W. Adams st......	W. Jackson st.....	108 00
279	20	Halsted st......	W. Lake st........	W. Harrison st....	798 75
280	3	Robey st.......	W. Monroe st.....	W. Madison st.....	108 00
281	5	Market st......	Quincy st.........	Van Buren st.....	180 00
282	9	Clark st........	Twelfth st........	Fourteenth st.....	324 00
283	1	Twenth-eighth..	Michigan av. and a	point 125 ft. west..	36 00
284	2	Sheldon st......	W. Lake st.......	W. Randolph st...	72 00
285	2	Tyler st........	Center av........	Aberdeen st	72 00
286	3	Whitney st.....	N. Dearborn st....	N. State st........	108 00
287	3	Chestnut place..	N. Clark st........	N. Dearborn st....	108 00
288	3	Desplaines st...	W. Lake st........	W. Washington st.	135 00
289	2	Whitney st....	N. Wells st. to east	terminus Whiting.	72 00
290	12	Michigan av....	Thirty-first st.....	Thirty.third st....	432 00
291	14	Prairie av......	Twenty-ninth st...	Thirtieth st.......	495 00
292	5	Twenty-third st	Cottage Grove av..	Michigan av	180 00
293	1	N. La Salle st...	Chicago av........	Chestnut st.......	36 00
294	2	Wendell st.....	N. Franklin st....	N. Wells st.......	72 00
295	4	Twenty-fourth..	Wabash av........	State st...........	144 00
296	2	Oak st.........	N. Franklin st....	N. Wells st.... ..	72 00
297	3	Thirty-second st	State st......	Wabash av.........	108 00
325	3	Monroe st......	Sangamon st......	Green st..........	108 00
326	7	Michigan st....	La Salle st........	Kingsbury st......	252 00
327	3	Green st.......	Jackson st........	Van Buren st.....	108 00
328	6	State st........	Huron st..........	Michigan st.......	216 00
329	5	State st........	S. Water st........	Randolph st......	193 50
330	3	Michigan av....	The River.........	S. Water st	108 00
331	2	Hubbard court..	State st...........	Wabash av	72 00
332	4	Huron st	Pine st...........	Cass st...........	144 00
333	7	Desplaines st...	Van Buren st.....	Madison st........	319 50
334	4	Twenty-sixth st.	Michigan av......	Wabash av........	144 00
335	4	Twentieth st...	Prairie av.........	Indiana av........	144 00
336	7	W. Monroe st...	Reuben st., to a	point 118 ft. east..	252 00
337	6	Wabash av.....	Thirty-first st.....	Thirty-second st...	216 00
338	7	Monroe st......	Clark st...........	Market st.........	265 50
339	8	Peoria st... ...	W. Van Buren st..	W. Harrison st....	288 00
340	10	Twelfth st.....	Clark st...........	The bridge.......	288 00
341	14	W Twelfth st..	Canal st..........	The bridge.......	495 00
342	10	Adams st......	Wabash av........	Market st.........	360 00
343	12	W. Eighteenth..	Canal st..........	18th st. bridge.....	432 00
344	26	N. Franklin st..	Chicago av........	Division st........	936 00
345	50	State st.........	Twenty-third st...	Thirty-second st...	1,629 00
399	2	Carpenter st...	Lake st...........	Randolph st.......	72 00
400	4	Fulton st......	Lincoln st........	Wood st..........	140 40
401	10	Walnut st......	Reuben st	Wood st..........	360 00
402	3	Green st........	Randolph st	Washington st.....	108 00
403	2	Loomis st......	Adams st	Jackson st.........	72 00
404	2	Jefferson st.....	Jackson st........	Van Buren st......	72 00
405	6	Dearborn st....	N. Water st.......	Ontario st.........	216 00

Total.......... .... $12,369 15

Amount to be paid by city from general fund on account of above, 1,374 35

STATEMENT OF ASSESSMENTS FOR ERECTION OF LAMP POSTS.—CONTINUED.

No. of Warr'nt	No. Posts	NAME OF STREET.	FROM	TO	Amount of Assessment.
					12,369 15
406	3	Morgan st........	Jackson st........	Van Buren st.....	108 00
407	3	Thirteenth st...	State st.........	Wabash av.... ...	108 00
408	13	La Salle st.....	Madison st........	Van Buren st.....	463 50
409	16	Desplaines st...	Lake st...........	Fourth st.........	558 00
410	9	Milwaukee av..	Desplaines st.....	Rucker st.........	324 00
495	5	Aberdeen st....	Van Buren st.....	Tyler st...........	180 00
496	4	Jackson st......	Center av........	Aberdeen st......	144 00
497	2	Washington st..	Clinton st...	Desplaines st.....	72 00
498	7	Tyler st........	Morgan st........	Aberdeen st......	252 00
499	7	University place	Cottage Grove av..	450 ft. west thereof	144 00
500	6	Lake st.........	Leavitt st.........	Oakley st.........	216 00
501	20	W. Monroe st...	Reuben st.........	Robey st..	684 00
502	2	Huron st.......	Wells st...........	La Salle st........	72 00
503	2	Morgan st......	Monroe st.........	Adams st.........	72 00
504	4	Douglas place..	Moonaway place.	330 ft. west thereof	144 00
505	4	Reuben st......	Van Buren st.....	Tyler st..........	144 00
506	11	Division st.....	Larrabee st.......	Clybourn av......	396 00
507	4	Elm st.........	Franklin st........	La Salle st........	144 00
508	6	Sangamon st...	Harrison st.......	Van Buren st.....	216 00
509	11	Ellis av........	Douglas place.....	Wahpanseh av....	396 00
510	3	Division st.....	Dearborn st.......	State st...........	108 00
511	11	Robey st.......	Madison st........	Jackson st........	396 00
512	6	Van Buren st...	Morgan st........	Aberdeen st......	216 00
513	9	Sedgwick st....	Sophia st.........	Clark st...........	324 00
514	5	Paulina st......	Adams st.........	Monroe st.........	180 00
515	2	Sedgwick st....	Superior st.......	Chicago av........	72 00
516	5	Sedgwick st....	Elm st............	Hobbie st.........	180 00
517	2	S. Ann st.......	Randolph st.......	Washington st....	72 00
518	2	Peck court.....	State st...........	Wabash av........	72 00
519	7	Douglas place..	Cottage Grove av..	Lake av...........	252 00
520	2	Laflin st.......	Madison st.......	Monroe st.........	72 00
521	4	Twent-second st	Calumet av.......	Kankakee av.....	144 00
522	7	Lincoln st......	Madison st........	Adams st.........	252 00
523	2	Carpenter st....	Washington st....	Madison st........	72 00
524	14	Hobbie st......	Sedgwick st.......	Crosby st........	494 00
525	7	Honore st......	Monroe st.........	Jackson st........	252 00
526	1	Market st......	Kinzie st..........	Michigan st.......	36 00
527	7	Newberry st....	Twelfth st........	Taylor st.........	252 00
528	40	Halsted st......	Sixteenth st.......	Chicago River.....	1,314 00
535	27	Halsted st......	Twelfth st.... ...	Sixteenth st.......	904 50
536	51	N. Clark st.....	Fullerton av.. ...	North av.........	1,836 00

Total..................................	$24,707 15
Amount to be paid by city from general fund on account of above,	2,746 35

Statement of Assessments for construction of Private Drains.

No. of Warr'nt	NAME OF STREET.	FROM	TO	Amount of Assessments.
465	Adams st.........	Michigan av.......	Market st.........	$574 00
466	Archer av	Stewart “	State “	754 22
467	Prairie “	Twenty-second st..	Cottage Grove av..	223 10
468	State st...........	Michigan st.......	Chicago av........	531 76
469	Desplaines st......	Fourth “	VanBuren st......	1,178 95
470	Pine “	Michigan “	Chicago av........	334 84
471	Sangamon “	Kinzie “	VanBuren st......	751 28
472	Huron “	Clark “	Dearborn “	118 68
473	Monroe “	Market “	State “	900 16
474	Ohio “	St. Clair “	N. Clark “	911 38
475	N. Clark “	Chicago av........	Division “	1,236 73
476	Harmon court.....	State st....... ...	Michigan av......	160 00
477	Franklin st........	S. Water st........	Madison st........	307 40
478	Blue Island av.....	Harrison “	Twelfth “	1,035 00
479	Griswold st........	VanBuren st......	Polk “	431 75
480	W. VanBuren st...	The River.........	Halsted “	1,179 02
481	Sherman “ ..	VanBuren st......	Harrison“	204 75
482	Twenty-second“ ..	The Lake.........	State “	487 00
483	W. Adams “ ..	Canal st..........	Halsted “	368 00
484	Halsted “ ..	Harrison st........	Rail Road Crossing	1,223 50
485	Michigan “ ..	N. Clark st........	Kingsbury st......	639 58

Total,.. $13,551 10

Amount to be paid by city from general fund on account of above, 140 85

Statement of Assessments for construction of Water Service Pipes.

No. of Warr'nt	NAME OF STREET.	FROM	TO	Amount of Assessments.
369	Halsted st.........	Harrison st.......	C. B. & Q. R. R. Crossing.	$2,650 67
375	N. Clark st........	Chicago av........	Division st........	2,030 00
376	W. Adams st......	Canal st...........	Halsted “	371 44
377	Michigan “	N Clark st........	Kingsbury st......	1,021 70
378	N. State “	Michigan “	Chicago av........	932 90
379	W. VanBuren.....	Canal “	Halsted st.........	857 43
493	Twenty-second st..	State “	Kankakee av......	779 55
494	Prairie av.........	Twenty-second st..	Cottage Grove av..	258 88

Total,... .... $8,902 57

Amount to be paid by city from general fund on account of above, 81 75

Statement of Assessments for construction of Gas Service Pipes.

No. of Warr'nt	NAME OF STREET.	FROM	TO	Amount of Assessments.
487	Halsted st.........	Twelfth st........	Sixteenth st..	$352 75
488	W. Adams st......	Canal st.	Halsted st.........	62 25
489	Halsted st., bet. Polk st.	and S. line, N. ½ Block 21,	C. T. Subd'n E. ¼, Sec. 17	269 75
490	W. Washington st..	Halsted st.........	Clinton st.........	113 25
491	Halsted st.........	Twelfth st.........	Sixteenth st.......	63 00
492	Blue Island av.....	Harrison st........	Twelfth st.........	448 50

Total,.. $1,309 50

Amount to be paid by city from general fund on account of above,. 18 00

SUMMARY.

TOTAL ASSESSMENT FOR STREET OPENINGS AND WIDENINGS.

North Division	$ 7,554 65	
South Division	206,810 19	
West Division	161,745 73	
		$376,110 57

TOTAL ASSESSMENT FOR ALLEY OPENINGS AND WIDENINGS.

North Division	$ 4,114 23	
South Division	8,817 67	
West Division	15,035 25	
		27,967 15

TOTAL ASSESSMENT FOR WOODEN BLOCK PAVEMENT.

North Division	4.65 miles,	351,537 36	
South Division	7.48 "	581,448 07	
West Division	9.28 "	823,790 99	
			1,756,776 42

TOTAL ASSESSMENT FOR MISCELLANEOUS STREET AND ALLEY IMPROVEMENTS.

North Division	3,201 04	
South Division	146,222 41	
West Division	19,801 38	
		169,224 83

TOTAL ASSESSMENT FOR ERECTION OF LAMP POSTS.

North Division	167 posts,	$ 6,002 00	
South Division	205 "	7,042 50	
West Division	327 "	11,662 65	
			24,707 15

TOTAL ASSESSMENT FOR CONSTRUCTION OF PRIVATE DRAINS.

North Division	$3,241 21	
South Division	4,142 39	
West Division	6,167 50	
		13,551 10

TOTAL ASSESSMENT FOR CONSTRUCTION OF WATER SERVICE PIPES.

North Division	$3,984 60	
South Division	1,038 43	
West Division	3,879 54	
		$8,902 57

TOTAL ASSESSMENT FOR CONSTRUCTION OF GAS SERVICE PIPE.

North Division		
South Division		
West Division	$1,309 50	
		1,309 50

TOTAL ASSESSMENT FOR CONSTRUCTION OF SIDEWALKS.

North Division	$ 720 12	
South Division	7,599 95	
West Division	8,813 67	
		17,133 74
Total amount of assessment for North, South and West Divisions,		$2,395,683 03

Total amount of assessment for street improvements in the North Division	$380,355 21	
Total am't payable out of "Appropriation Fund" on account of street improvements in North Division,	91,002 30	
Total estimated cost of street improvements in the North Division,		471,357 51
Total amount of assessments for street improvements in the South Division	$963,121 61	
Total am't payable out of "Appropriation Fund" on account of street improvements in South Division,	124,418 03	
Total estimated cost of street improvements in the South Division,		1,087,539 64
Total amount of assessments for street improvements in the West Division	$1,052,206 21	
Total am't payable out of "Appropriation Fund" on account of street improvements in the West Division,	158,065 01	
Total estimated cost of street improvements in the West Division		1,210,271 22
Total estimated cost of street improvemenis in the North, South and West Divisions		$2,769,168 37

TO BE PAID FROM "APPROPRIATION FUND" FOR STREET IMPROVEMENTS.

The North Division	$ 91,002 30	
The South Division	124,418 03	
The West Division	158,065 01	
		373,485 34
Total		$373,485 34

The following is a statement of the amount of work done on account of street improvements, provided for by the assessments of the year ending April 1st, 1869:

Whole number of cords of Curb Wall	85,502 52-100
Whole number of lineal feet of Curb Stone	105,163 98-100
Whole number of cubic yards of Filling	314,203 46-100
Whole number of cubic yards of Excavating and Grading	80,811 6-100
Whole number of square yards of Wooden Block Paving	569,940 72-100
Whole number of miles of Wooden Block Pavement	21 41-100
Whole number of cubic yards of Graveling	8 738 30 100

Total number of Lamp Posts provided for by assessment:

IN THE NORTH DIVISION,		
From April 1st, 1868, to April 1st, 1869	167	
Posts erected prior to April 1st, 1868	860	
		1,027
IN THE SOUTH DIVISION,		
From April 1st, 1868, to April 1st, 1869	205	
Posts erected prior to April 1st, 1868	1206	
		1,411
IN THE WEST DIVISION,		
From April 1st, 1868, to April 1st, 1869	327	
Posts erected prior to April 1st, 1868	1531	
		1858
Total number of Lamp Posts in the city		4296

During the past year there has been prepared and sent to the Council the following number of Ordinances in connection with the Special Assessment business of the Board:

For Street Improvements	117
For Alley Improvements	49
For Miscellaneous Improvements	39
For Sidewalks	237
For the erection of Lamp Posts	135
For the construction of Private Drains	50
For laying Water Service Pipe	34
For laying Gas Service Pipe	9
For Street and Alley openings and widenings	55
Total	725

The following list shows the total amount of assessments made in each year, by the Board of Public Works, since it was created in 1861:

For the year ending April 1st, 1862	$ 42,635 49	
For the year ending April 1st, 1863	46,493 67	
For the year ending April 1st, 1864	389,169 31	
For the year ending April 1st, 1865	103,576 35	
For the year ending April 1st, 1866	802,574 56	
For the year ending April 1st, 1867	317,206 18	
For the year ending April 1st, 1868	1,354,436 48	
For the year ending April 1st, 1869	2,395,683 03	
		5,451,775 07
Total for eight years		$5,451,775 07

NOTE.—A large share of the Sidewalks, Drains, Gas and Water Service Pipes, provided for by Ordinances, has been constructed by private parties, at their own expense, and no assessment has been made for such portion.

Respectfully submitted,

F. H. BAILEY,

In charge of Special Assessments.

SIDEWALKS.

Mr. A. W. Tinkham,

Secretary of the Board of Public Works.

Sir: The undersigned respectfully presents his report relating to the construction and reconstruction of sidewalks, from April 1, 1868, to March 31, 1869, under the following ordinances:

NORTH DIVISION.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	BUILT	EXCEPT.
S. S.	Ohio st.	N. Market st.	Kingsbury st.	610	All	
B. S.	Haines st.	Larrabee st.	Crosby st.	610	"	
B. S.	Elm st.	Larrabee st.	N. Wells st.	2,200	"	
N. S.	Goethe st.	N. Clark st.	N. Wells st.	750	"	
S. S.	Belden av.	Orchard st.	N. Halsted st.	625	"	
N. S.	Illinois st.	St. Clair st.	Seneca st.	300	"	
S. S.	Belden av.	Larrabee st.	N. Clark st.	1,067	"	
S. S.	Elm st.	N. Franklin st.	N. Wells st.	310	"	
B. S.	N. Halsted st.	The Bridge	N. Branch st.	400	"	
B. S.	Sedgwick pl.	Division st.	Elm st.	566	"	
S. S.	Oakwood st.	Rush st.	Lake Michigan	833	"	
B. S.	Hill st.	N. Franklin st.	N. Wells st.	620	"	
B. S.	Burton place	N. Clark st.	N. Dearborn st.	596	"	
S. S.	Belden av.	Orchard st.	N. Franklin st.	2,177	"	
S. S.	North av.	Halsted st.	Larrabee st.	1,139	"	
W. S.	Vine st.	North av.	Willow st.	974	"	
B. S.	Haines st.	Crosby st.	Hawthorn av.	500	"	
E. S.	State st.	Division st.	Grand Haven	615	"	
S. S.	Division st.	Larrabee st.	Hawthorn av.	1,144	"	
E. S.	Church st.	Center st.	Wisconsin st.	594	"	
S. S.	Indiana st.	Market st.	N. Branch	943	"	
N. S.	N. Branch st.	Halsted st.	Bliss st.	856	"	
E. S.	Hurlbut st.	Black Hawk st.	North av.	580	"	
B. S.	N. LaSalle st.	North av.	N. Clark st.	1,585	"	
S. S.	Michigan st.	N. Market st.	Kingsbury st.	343	"	
W. S.	Church st.	Menominee st.	Linden st.	72	"	
W. S.	Pleasant st.	Vedder st.	Division st.	22	"	
S. S.	Grant place	Sedgwick st.	Larrabee st.	1,136	"	
W. S.	Rush st.	Chicago av.	Hinsdale st.	455	"	
			Total	22,622		

SOUTH DIVISION.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	BUILT	EXCEPT.
S. S.	Thirty-second	State st.	Burnside st.	250	Built	
S. S.	Burnside st.	Thirty-second	Thirty-third	550	"	
W. S.	Prairie av.	Twenty-ninth	Thirty-first	1,121	"	
N. S.	Sixteenth st.	Indiana av.	Prairie av.		"	
W. S.	Blackwell st.	Eighteenth st.	Twentieth st.	725	"	
S. S.	Wahpanseh av.	Stewart av.	State st.	2,600	"	
B. S.	Thirty second	Indiana av.	State st.	2,500	"	
B. S.	Burnside st.	27th st.	Thirty-second	5,218	"	
E. S.	Prairie av.	Twenty-ninth	Thirty-first	1,200	"	
S. S.	Thirtieth st.	State st.	Indiana av.	1,033	"	
N. S.	Twenty-fifth st.	State st.	Wabash av.	383	"	
W. S.	Wabash av.	Thirty-first st.	Thirty-second	1,372	"	
S. S.	Fuller st.	Archer av.	Hickory st.	1,152	"	ex. 76 ft.
B. S.	Sheridan place	Purple st.	Wentworth av.	1,154	"	
B. S.	Bushnell st.	Wentworth av.	Hanover st.	3,172	"	
E. S.	Prairie av.	Sixteenth st.	Twenty-second	2,405	"	
E. S.	Vincennes av.	Wahpanseh av.	Douglas place	1,287	"	
W. S.	Prairie av.	Thirty first st.	Thirty-third st.	1,272	"	
W. S.	Prairie av.	Douglas place	S. Line, B. 4 in Dyer & Davidson's Sub.	766	"	
E. S.	Arnold st.	27th st.	Thirty-first st.	1,997	"	
E. S.	Calumet av.	Twenty-second	Twenty-ninth	2,407	"	
B. S.	LaSalle st.	Jackson st.	Van Buren st.	734	"	
N. S.	Twenty-ninth	State st.	Wentworth av.	999	"	
E. S.	Broadway av.	S. Line L. 2	So. Terminus	284		
S. S.	University pl.	Cottage Gr. av.	Rhodes av.	724	"	
E. S.	Kankakee av.	Wahpanseh av	Douglas place	1,294	"	
E. S.	Twenty-fourth	State st.	Clark st.	606	"	
E. S.	Cottage Gr. av.	Twenty-ninth	Egan av.	6,666	"	ex. 636 ft.
B. S.	Harrison st.	Franklin st.	Wells st.	640	"	ex. 640 ft.
S. S.	Northern av.	Cottage Gr. av.	R. R. Station	565	"	ex. 103 ft.
N. S.	Twenty-ninth	Indiana av.	Calumet av.	730	"	
B. S.	Thirty-second	Burnside st.	Butterfield st.	420	"	
E. S.	Kankakee av.	Northern av.	Cottage Gr. av.	298	"	
W. S.	Halsted st.	Archer av.	Egan av.	7,435	"	partly.
S. S.	Archer av.	Lime st.	Quarry st.	896		not built.
W. S.	Main st.	South Branch	Thirty-first st.	3,789	"	
N. S.	Thirtieth st.	Kankakee av.	Cottage Gr. av.	668	"	
B. S.	Thirty-second	Indiana av.	State st.	2,053	"	
N. S.	McGregor st.	Butler st.	Wentworth av.	748	"	
W. S.	Sanger st.	Archer av.	Twenty-Sixth	970	"	
E. S.	Michigan av.	Thirty-second	Douglas place	1,785	"	
S. S.	Napoleon pl.	Buddan st.	Wentworth av.	600	"	
B. S.	Hickory st.	Main st.	Deering st.	1,985	"	
W. S.	Wentworth av.	Sixteenth st.	Thirty-first st.	7,080	"	partly.
E. S.	Wallace st.	McGregor st.	Twenty-sixth	750	"	
S. S.	McGregor st.	Butler st.	Wallace st.	373	"	
W. S.	Lake av.	Douglas place	Egan av.	2,440	"	ex. 421 ft.
B. S.	Butterfield st.	27th st.	Thirty-third st.	6,072	"	ex. 725 ft.
E. S.	Arnold st.	Thirty-first st.	Thirty-third st.	1,258	"	
W. S.	Deering st.	Archer av.	R. R. Crossing	345		ex. 25 ft.
W. S.	Lock st.	Archer av.	Fuller st.	899		not built.
E. S.	Lock st.	Archer av.	Thirty-first st.	738		½ built.
E. S.	Pitney av.	Archer av.	Thirty-first st.	1,796	"	
N. S.	Twenty-fifth st	Sanger st.	Stewart av.	516		not built.

SOUTH DIVISION—CONTINUED.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	BUILT	EXCEPT.
N. S.	Twentieth st.	Wentworth av.	Grove st.	787	Built	ex. 130 ft.
B. S.	Purple st.	Nineteenth st.	Archer av.	1,863		partly.
N. S.	Nineteenth st.	State st.	Blackwell st.	1,135	“	ex. 134 ft.
E. S.	Sanger st.	Archer av.	Twenty-sixth	970	“	ex. 230 ft.
W. S.	Shurtleff av.	Twenty-sixth	Napoleon pl.	925	“	ex. 250 ft.
S. S.	Twenty sixth	State st.	Wentworth av.	1,290	street not opened.	
N. S.	Archer av.	South Branch	Beers st.	1,928		partly.
E. S.	Bonfield st.	R. R. Crossing	Hickory st.	366		“
B. S.	Joseph st.	Archer av.	Hickory st.	1,600		“
E. S.	Farrell st.	Archer av.	R. R. Crossing	398		“
E. S.	Murray st.	Twenty sixth	Archer av.	635		ex. 180 ft.
S. S.	Nineteenth st.	Purple st.	Blackwell st.	216		not built.
E. S.	State st.	Douglas place	Egan av.	2,228		“ “
				111,935		

WEST DIVISION.

SIDE.	STREET.	FROM	TO	Frontage.	BUILT	EXCEPT.
S. S.	Warren av.	Hoyne st.	Leavitt st.	600	Built.	
S. S.	Warren av.	Oakley st.	Western av.	600	“	
S. S.	Walsh st.	Halsted st.	Center av.	7,170	“	
B. S.	Dobyn st.	Waller st.	Blue Island av.	1,400	“	
E. S.	Elizabeth st.	Hunt st.	Fourth st.	250	“	
S. S.	Hunt st.	Rucker st.	Elizabeth st.	500	“	
W. S.	Elizabeth st.	W. Indiana st.	Fourth st.	400	“	
S. S.	Fourth st.	Rucker st.	Elizabeth st.	500	“	
E. S.	Lessing st.	Chicago av.	Front st.	310	“	
B. S.	Monroe st.	Reuben st.	Leavitt st.	7,000	“	
N. S.	Harbine st.	Blue Island av.	Lincoln st.	1,700	“	
S. S.	First st.	Noble st.	Reuben st.	1,200	“	
E. S.	Ada st.	Fulton st.	Kinzie st.	623	“	
W. S.	Ada st.	Kinzie st.	Hubbard st.	309	“	
E. S.	Loomis st.	Van Buren st.	Tyler st.	334	“	
N. S.	Jackson st.	Lincoln st.	Hoyne st.	946	“	
B. S.	Morgan st.	Tyler st.	Van Buren st.	723	“	
W. S.	Paulina st.	Cornelia st.	Emily st.	840	“	
N. S.	Polk st.	Loomis st.	Laflin st.	598	“	
N. S.	Tyler st.	Peoria st.	Aberdeen st.	1,104	“	
E. S.	Hoyne st.	Adams st.	Van Buren st.	757	“	
N. S.	Park av.	Leavitt st.	Oakley st.	598	“	
N. S.	Clybourn pl.	Elston Road	Wood st.	1,455	“	
B. S.	Emma st.	Milwaukee av.	West terminus	1,402	“	
N. S.	W. 22d st.	Blue Island av.	Robey st.	2,400	“	
W. S.	Blue Island av.	Harbine st.	W. 22d st.	1,310	“	
W. S.	Leavitt st.	Lake st.	Park av.	212	“	
B. S.	Hamilton st.	Monroe st.	Jackson st.	1,950	“	
W. S.	Burlington st.	W. Sixteenth	W. Eighteenth	769	“	
W. S.	Paulina st.	Carroll st.	Kinzie st.	248	“	
E. S.	Johnson st.	W. Twelfth st.	Maxwell st.	820	“	

WEST DIVISION—CONTINUED.

SIDE.	STREET.	FROM	TO	Frontage.	BUILT EXCEPT.
W. S.	Winchester st.	W. Adams st.	Van Buren st.	746	Built.
B. S.	Van Buren st.	Hoyne st.	Robey st.	1,111	“
N. S.	Cornelia st.	Milwaukee av.	Reuben st.	1,860	“
W. S.	Seeley av.	Adams st.	Van Buren st.	760	“
E. S.	Paulina st.	Cornelia st.	Emily st.	800	“
E. S.	Perch st.	Fulton st.	Kinzie st.	618	“
N. S.	Catherine st.	Canal st.	Stewart av.	520	“
S. S.	Chicago av.	Carpenter st.	Chi. av. Bridge	2,174	“
E. S.	W. Water st.	Madison st.	Randolph st.		not built.
B. S.	Aberdeen st.	Damon st.	W. Twelfth st.	2,316	built ex. 100 ft.
W. S.	N. Reuben st.	Milwaukee av.	Clybourn place	3,815	“
N. S.	W. Sixteenth	Blue Island av.	Laflin st.	1,037	“
S. S.	Sixteenth st.	Center av.	Halsted st.	2,520	“
N. S.	Gurley st.	Sholto st.	Miller st.	204	“
S. S.	Nebraska st.	Loomis st.	Laflin st.	600	“
E. S.	Robey st.	Madison st.	Harrison st.	192	“
W. S.	Brown st.	Twelfth st.	Sixteenth st.	2,400	“
B. S.	Liberty st.	Jefferson st.	Canal st.	1,432	“
E. S.	Oakley st.	Kinzie st.	Fourth st.	1,025	“
W. S.	Lincoln st.	Jackson st.	Adams st.	375	“
S. S.	Adams st.	Robey st.	Honore st.	799	“
E. S.	Winchester st.	Jackson st.	Adams st.	367	“
B. S.	Adams st.	Hoyne st.	Leavitt st.	1,038	“
N. S.	Monroe st.	Loomis st.	Leavitt st.	1,200	“
E. S.	Waller st.	Mitchell st.	Twelfth st.	1,210	“
E. S.	Paulina st.	Division st.	Emily st.	700	“
E. S.	Laflin st.	Taylor st.	Sampson st.	136	“
W. S.	Paulina st.	Chicago av.	Kinzie st.	2,060	“
S. S.	Jackson st.	Reuben st.	Honore st.	1,175	“
N. S.	Jackson st.	Wood st.	Lincoln st.	335	“ ex. 75 ft.
W. S.	Leavitt st.	Jackson st.	Madison st.	1,155	“ ex. 145 ft.
E. S.	Rucker st.	Indiana st.	Second st.	915	“
E. S.	Union st.	Sixteenth st.	Twenty-second	2,343	“ ex. 350 ft.
S. S.	Armour st.	Chicago av.	Second st.	495	“
W. S.	Jefferson st.	Canalport av.	Lumber st.	1,401	“ ex. 250 ft.
B. S.	Henry st.	Blue Island av.	E. Terminus of Henry	2,400	“ ex. 1,011 ft.
N. S.	Division st.	Milwaukee av.	Houghton st.	858	“
N. S.	Canalport av.	Jefferson st.	Union st.	723	not built.
N. S.	Indiana st.	Lincoln st.	Robey st.	600	“ ex. 192 ft.
E. S.	Lincoln st.	Lake st.	Washington st.	717	“
S. S.	Van Buren st.	Reuben st.	Robey st.	1,983	“
N. S.	Catherine st.	Throop st.	Laflin st.	1,200	“
S. S.	Jackson st.	Loomis st.	Reuben st.	1,160	“
N. S.	Polk st.	Morgan st.	Sholto st.	450	“
W. S.	Hoyne st.	Madison st.	Warren av.	266	“
E. S.	Paulina st.	Jackson st.	Van Buren st.	396	“ ex. 100 ft.
S. S.	Second st.	Paulina st.	Reuben st.	600	“
E. S.	Beach st.	Polk st.	Harrison st.	713	“
E. S.	Lytle st.	Taylor st.	Twelfth st.	761	“ ex. 136 ft.
E. S.	Rucker st.	Indiana st.	Kinzie st.	628	“
N. S.	Fulton st.	Leavitt st.	Western av.	1,052	“
E. S.	Paulina st.	Second st.	W. Erie st.	248	“
W. S.	Lessing st.	Chicago av.	George st.	684	“
W. S.	Fifth st.	Front st.	To terminus	499	“

WEST DIVISION—CONTINUED.

SIDE.	STREET.	FROM	TO	Frontage.	BUILT EXCEPT.
W. S.	Morgan st.	Twelfth st.	Sixteenth st.		Not built.
S. S.	Catherine st.	Throop st	Loomis st.		" "
E. S.	Center st.	Twelfth st.	Blue Island av.		" "
B. S.	Ann st.	Kinzie st.	Carroll st.		" "
N. S.	Mitchell st.	Blue Island av.	Waller st.		" "
E. S.	Ruble st.	Sixteenth st.	Eighteenth st.		" "
S. S.	Washington st.	Leavitt st.	Western av.		" "
E. S.	Paulina st.	Jackson st.	Madison st.		" "
				98,600	

To properly understand the business of this department, the following monthly reports of work are shown :

	Gross Amount.	New Walk.	
April	27,296 ft.	13,969 ft.	
May	49,375 "	25,638 "	
June	54,713 "	23,807 "	
July	49,454 "	19,062 "	
August	41,999 "	18,869 "	
September	34,854 "	16,232 "	
October	48,631 "	24,941 "	
November	33,233 "	19,305 "	
December	16,755 "	13,647 "	
January	15,445 "	10,791 "	
February	8,381 "	4,338 "	
March	6,961 "	4,727 "	
Total	387,097 ft.	195,326 ft.	Total extended walks.

Equal to $73\frac{7}{10}$ miles constructed and reconstructed during the year, leaving now in charge of this department, 470 miles.

Sidewalks Assessed and Built by Contractor.

WEST DIVISION.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	COST.
B. S.	Fay st.	W. Erie st.	Pratt st.	568	$ 231.85
E. S.	Ann st.	Fulton st.	Carroll st.	48	19.68
E. S.	Paulina st.	Chicago av.	Clarinda st.	122	50.02
S. S.	Chicago av.	Milwaukee av.	Carpenter st.	100	42.00
S. S.	Warren av.	Leavitt st.	Oakley st.	67½	27.67
S. S.	Taylor st.	Throop st.	Loomis st.	150	63.00
E. S.	Newberry st.	Lot 30, B. 11	Wright st.	175	73.50
S. S.	Mitchell st.	Blue Island av.	Waller st.	192	78.72
S. S.	Maxwell st.	Blue Island av.	Johnson st.	348	146.16
W. S.	May st.	Evans st.	Twenty-second	160	65.60
N. S.	Cornell st.	Noble st.	Reuben st.	25	10.25
N. S.	Indiana st.	Wood st.	Lincoln st.	24	10.08
N. S.	North av.	Milwaukee av.	Elston road.	343	140.63
S. S.	Frank st.	Waller st.	Blue Island av.	384	157.44
E. S.	Ridgeville road.	Elk st.	Blackhawk st.	72	29.52
S. S.	Hubbard st.	Elizabeth st.	Western av.	459	187.98
E. S.	Center av.	Blue Island av.	Sixteenth st.	131	53.71
S. S.	Nebraska st.	Throop st.	Loomis st.	25	10.50
N. S.	Kansas st.	Throop st.	Loomis st.	25	10.50
S. S.	Fulton st.	Hoyne st.	Robey st.	30	12.30
S. S.	Indiana st.	Reuben st.	Paulina st.	24	10.08
W. S.	Wallace st.	Twelfth st.	Maxwell st.	27	11.34
S. S.	Pratt st.	Halsted st.	Sangamon st.	180	75.60
N. S.	Wabansia av.	Elston road.	Milwaukee av.	622½	255.22
B. S.	Dickson st.	Division st.	North Terminus	33	13.53
B. S.	Smart st.	Kinzie st.	Hubbard st.	50	20.50
E. S.	Oakley st.	Kinzie st.	Madison st.	175	71.75
E. S.	Reuben st.	Milwaukee av.	Blackhawk st.	168	68.40
B. S.	Van Buren st.	Hoyne st.	Robey st.	238½	97.78
B. S.	Hamilton st.	Monroe st.	Jackson st.	135½	55.55
B. S.	Morgan st.	Tyler st.	Van Buren st.	177	72.57
B. S.	Monroe st.	Reuben st.	Leavitt st.	103½	42.43
N. S.	Jackson st.	Lincoln st.	Hoyne st.	257	105.37
N. S.	Park av.	Leavitt st.	Oakley st.	30	12.30
N. S.	Tyler st.	Peoria st.	Aberdeen st.	133	54.53
N. S.	Polk st.	Loomis st.	Laflin st.	192	78.72
E. S.	Ada st.	Fulton st.	Kinzie st.	115	47.15
E. S.	Lessing st.	Chicago av.	Front st.	56	22.96
B. S.	Dobyn st.	Waller st.	Blue Island av.	113	46.33
S. S.	Adams st.	Loomis st.	Reuben st.	149	61.09
E. S.	Johnson st.	Twelfth st.	Maxwell st.	48	20.50

WEST DIVISION—CONTINUED.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	COST.
W. S.	Winchester st.	Adams st.	Van Buren st.	306	$125.46
S. S.	First st.	Noble st.	Reuben st.	26	10.25
E. S.	Paulina st.	Cornelia st.	Emily st.	100	41.00
W. S.	Lessing st.	Chicago av.	George st.	57½	23.58
B. S.	Emma st.	Milwaukee av.	West terminus	248	101.68
E. S.	Perch st.	Fulton st.	Kinzie st.	90	36.90
S. S.	Nebraska st.	Loomis st.	Laflin st.	211	86.51
S. S.	Adams st.	Robey st.	Honore st.	48	19.68
W. S.	Reuben st.	Milwaukee av.	Clybourn place	336	149.88
W. S.	Nutt st.	Sixteenth st.	South terminus	144	59.04
N. S.	Clybourn place	Elston road	Wood st.	556	227.96
S. S.	Sixteenth st.	Centre av.	Halsted st.	298	122.18
E. S.	Robey st.	Madison st.	Harrison st.	309½	126.90
E. S.	Waller st.	Mitchell st.	Twelfth st.	486	201.27
E. S.	Laflin st.	Taylor st.	Sampson st.	433	176.53
			Total,	9,122½	$4,173.63

NORTH DIVISION.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	COST.
W. S.	Vine st.	North av.	Willow st.	253	$75.90

SOUTH DIVISION.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	COST.
W.S.	Wabash av.	Thirty-first st.	Thirty-second	50	$ 20.50
W.S.	Prairie av.	Twenty-ninth	Thirty-first st.	25	10.20
N. S.	Twenty-fifth	State st.	Wabash av.	175	71.75
S. S.	Twenty-fifth	Sanger st.	Wallace st.	48	19.68
W.S.	Stewart av.	Archer av.	Twenty-fourth	75	30.75
S. S.	Twenty-fourth	State st.	Butler st.	525	215.25
S. S.	Twenty-sixth	State st.	Michigan av.	187	76.67
B. S.	Burnside st.	27th st.	Thirty-second	525	215.25
B. S.	State st.	Twenty-eighth	Douglas place	556	227.96
W.S.	Wentworth av.	Thirty-first st.	Thirty-third st.	125	51.25
N. S.	Douglas place	Indiana av.	Wentworth av.	68	28.98 City.
N. S.	Douglas place	Indiana av.	Wentworth av.	659	270.19
S. S.	Douglas place	Cottage Gr. av.	Lake av.	168	68.88
W.S.	Prairie av.	Douglas place	Lot 4 in D. & D.'s Sub.	170	69.70
W.S.	Indiana av.	Thirty-second	Egan av.	481	214.93
W.S.	Calumet av.	Twenty-sixth	Thirty-first st.	136	55.76
E. S.	Calumet av.	22d st.	Twenty-ninth	250	102.50
E. S.	Kankakee av.	Twenty-ninth	Thirty-first st.	216	91.26
N. S.	Twenty-ninth	State st.	Wentworth av.	134	54.28
N. S.	Twenty-ninth	Indiana av.	Calumet av.	108	44.28
E. S.	Arnold st.	27th st.	Thirty-first st.	552	226.32

SOUTH DIVISION—CONTINUED.

SIDE.	STREET.	FROM	TO	NO. OF FEET.	COST.
B. S.	Sheridan place	Purple st.	Wentworth av.	490	$ 147.00
W.S.	Burnside st.	Twentieth st.	Twenty-first st.	25	10.25
S. S.	McGregor st.	Wallace st.	Sanger st.	50	20.50
E. S.	Calumet av.	Twenty-sixth	Twenth-ninth	26	10.66
W.S.	Butler st.	Twenty-sixth	McGregor st.	391	160.31
E. S.	Broadway st.	Lot A., D.'s	S. Terminus	274	112.34
B. S.	Bushnell st.	Wentworth av.	Hanover st.	474	194.34
W.S.	Main st.	Thirty-first st.	South Branch	562	230.42
S. S.	University pl.	Cottage Gr. av.	Rhodes av.	208	85.28
			Total,	8,733	$3,250.19

STONE, CONCRETE, GRAVEL AND BRICK WALKS.

It is deemed a matter of satisfaction to ascertain the accurate measurement of all Stone, Concrete, Gravel and Brick walks in the city at this date.

The following streets indicate the location of the same:

NORTH DIVISION.

STREET.	STONE.	CONCRETE.	GRAVEL	BRICK.
	FEET.	FEET.	FEET.	FEET.
Michigan Street	555			
N. Wells Street	125			
Kinzie Street	775			
La Salle Street	300			
N. Dearborn Street	200			
Rush Street	1275	428		
N. Water Street	150			
Cass Street	385	400		
N. Clark Street	675	....	192	
Indiana Street	250			
Ohio Street	625			
N. State Street	115	....	673	25
Ontario Street	80			
Huron Street	325			
Pine Street	225	100		
Superior Street	200			
Chicago Avenue	180			
Oak Street	100			
Erie Street	700			
Sophia Street	....	....	83	
N. Franklin Street	....	....	50	
Asylum Place	....	....	325	
Total	7240	928	1323	25

SOUTH DIVISION.

STREET.	STONE.	CONCRETE.	GRAVEL.	BRICK.
	FEET.	FEET.	FEET.	FEET.
Central Avenue	925			
Michigan Avenue	7090	31		
Wabash Avenue	6470	104		
Dearborn Street	2930			
State Street	2209			
Clark Street	3399			
LaSalle Street	2486			
Wells Street	1313			
Franklin Street	386			
Market Street	200			
Third Avenue	25			
Griswold Street	78			
Sherman Street	78			
Customs Place	200			
River Street	353			
South Water Street	3265			
Lake Street	4265			
Randolph Street	3825			
Washington Street	2631			
Madison Street	1068			
Monroe Street	697			
Adams Street	171			
Jackson Street	333			32
Van Buren Street	870			
Congress Street	50			
Harrison Street	182			
Indiana Avenue	811			
Prairie Avenue	685			
Calumet Avenue	50			
Park Row	330			
Sixteenth Street	138			
Hubbard Court	140			
Eldridge Court	140			
Twelfth Street	200			
S. Reuben Street			255	
Ellis Avenue			298	
Deering Street				25
Total	48013	135	553	57

WEST DIVISION.

STREET.	STONE.	CONCRETE.	GRAVEL.	BRICK.
	FEET.	FEET.	FEET.	FEET.
Aberdeen Street	261			
Adams Street	348			
Monroe Street	176			
Morgan Street	....	....	546	
Sangamon Street	122	....	375	
Tyler Street	....	....	255	
Brown Street	....	....	....	25
Madison Street	50			
W. Washington Street	1699			
Throop Street	201			
W. Lake Street	43			
W. Randolph Street	209			
Park Avenue	235			
Wood Street	312			
Willard Place	409			
Curtis Street	188			
Halsted Street	165			
South Western Avenue	260			
Sheldon Street	233			
Union Street	96			
Total	5007		1176	25

RECAPITULATION.

DIVISION.	STONE.	CONCRETE.	GRAVEL.	BRICK.
	FEET.	FEET.	FEET.	FEET.
North Division	7240	928	1323	25
South Division	48013	135	553	57
West Division	5007	....	1176	25
Totals	60260	1063	3052	107

SUMMARY STATEMENT.

Total number of miles of all kinds of walks	470
" " " feet of stone walks	60,260
" " " " wood walks	2,407,118
" " " " concrete walks	1,063
" " " " cinder and gravel walks	3,052
" " " " brick walks	107

The foregoing exhibit of plank walks now laid in the city, suggests the importance of introducing a substitute, which in the long run will prove cheaper and safer to the public. A concrete material, used extensively in Eastern cities, has recently been introduced here, and gives satisfactory evidence of a desirable improvement as to economy, cleanliness, and being without seam. Samples of it may be seen in the North Division, which have the test of the frosts of two winters. It does not appear to have cracked or slackened, but exhibits an increased hardness and smooth surface. It is better than stone for cheapness, never polishes by use, therefore assures greater safety to the pedestrian. This material should be laid on all streets improved to grade, and recommended in all parts of the city where streets are nearly at grade. On such streets, the sidewalk portion might be graded at comparatively little expense, thereby realizing a uniform level improvement, so much needed throughout the city.

Respectfully submitted,

J. L. HANCHETTE,
Supt. of Sidewalks.

BRIDGES.

Three pivot bridges were constructed during the year; at Twelfth street, Throop street and Division street.

The work of the year includes also under this head a long needed improvement, the viaduct at North Wells street, by which all travel passes above the trains of the North-Western Railway. The bridge portion is an iron trussed bridge of the kind known as the Truesdell patent.

The contrast is very great between the street as raised, in its present safe and commodious state, and its former condition at the level of the tracks, with trains passing every little while, obstructing and endangering the travel.

There is a growing conviction that all of the great thoroughfares should pass under or above any railroad traversing them.

The construction of a bridge at Indiana street, with a viaduct over the railway tracks, was commenced during the year, and steps taken for a similar construction at Adams street.

PUBLIC BUILDINGS.

Two important public edifices were commenced this year: the City Hall and the new Bridewell.

The space afforded to the city in the County Court House has been so limited that for years several of the departments have been obliged to seek offices elsewhere, and the Boards of Police, Education and Public Works are now located in private buildings, each by itself. As each department necessarily has intercourse with all the others, and a person having public business to transact generally has to deal with more than one department, it is desirable that all the general city offices should be grouped together in one building. Such accommodations it is expected will be afforded by the new City Hall. By an agreement with Cook County, made by your honorable body, the County and City have in process of erection, wings on the east and west fronts of the Court House, which, with the old part as it is to be improved, are designed to afford sufficient room both for the County and City officers. By the agreement referred to, the city has possession of the west half of the entire building. The county will occupy the east half.

During the year now reported on, not much progress was made on the building itself, excepting to lay the foundations.

On the Bridewell, work was commenced only. Contracts have been made for the erection of the main building, containing the cells for the prisoners, with wings for quarters for officers, and for the kitchen, dining room, &c. The workshops have not been placed under contract. It was thought that the labor of the convicts could be profitably employed in their erection. The work for this institution will also include the dredging of a channel up the west fork of the South Branch to the Bridewell Grounds.

Several new buildings were erected for the Boards of Police and Education.

A Police Station was erected at the corner of Madison and Union streets, and an Engine House on Sanger street between McGregor and Twelfth streets. Both buildings are in use.

During the year there were finished the fine four story brick School Houses known as the Clark and Franklin School Houses.

On other public buildings there was no unusual expenditure, except in the case of the North Market, which had been partially destroyed by fire, and which was roofed over and repaired.

PUBLIC PARKS.

Such advance was made during the year both on Lincoln Park and Union Park that before the close of the season they had become quite attractive. With the additional inducement of music, afforded on certain days through private liberality, the first named park was at times thronged with visitors. The general testimony of the citizens is that no expenditures give returns affording more general satisfaction than the comparatively small outlay on the public parks.

A contract was executed early in the year with Messrs. Nelson and Benson, the original contractors on Lincoln Park, for the grading and shaping of that part of the park (according to the original plan) not hitherto graded, for a large number of evergreen trees, for a drive connecting the park and cemetery, and for sodding and miscellaneous work as should be directed by the Board. This work has been in progress during the year. The park has, however, been visited by such large numbers of persons, that the necessary current expenditures for its maintenance in good order have amounted to a considerable share of the whole outlay.

At Union Park, great improvement was made. The carriage drives and walks were completed, the artificial lakes finished and filled with water, two iron bridges erected, one for carriages and one for pedestrians, various rustic bridges erected, seats supplied, trees planted and the grounds generally ornamented and improved.

At the smaller parks, there were not generally any large expenditures. An item of some interest should be noticed, however, in connection with Washington Park.

Late in the season a proposition was made by Mr. C. A. Hoyt, to lay patent concrete walks, ten feet wide, running diagonally across the park, at a price which apparently would be about the cost of the work. His proposition was accepted. The walks are formed with a composition of tar with sand, with some ashes, resting on a bed of broken stone and gravel, making a continuous and smooth surface without joints. The work was done late in November, and in December, and was interrupted by severe weather, with snow and ice. The walks, however, now appear well — without cracks or scales, affording a smooth and elastic surface to the tread of the pedestrian, and so far as tested, in the short interval since they were laid, give promise of durability.

The Board have caused the forty-acre tract belonging to the city, and lying north of the limits, to be enclosed with a fence.

The filled portion of the lake basin lying east of Michigan Avenue has also been similarly enclosed. By dumping into the basin such suitable material as was furnished gratuitously or at a small price, there has already been formed a tract of land over four acres in extent.

The Board were made the recipients during the year of an agreeable expression of courtesy and good will from the Commissioners of Central Park, N. Y., by the donation, through O. B. Green, Esq., of two pairs of swans, taken from the Central Park. They were placed at Lincoln Park, affording much pleasure to the visitors.

General regulations for the government of all the parks of the city were prepared by the Board, and embodied by your honorable body in the public ordinances of the city.

CONCLUSION.

In closing this report, the Board remark that much of its interest will be due to the sub-reports submitted herewith, and which, besides their usual amount of detail necessarily omitted here, contain a description of the Lake tunnel and of Washington street Tunnel, and a description and history of the Water Works. We respectfully invite your attention to these reports.

A. H. BURLEY,
JOHN McARTHUR,
W. H. CARTER.
Board of Public Works.

REPORT OF CITY ENGINEER.

To the Board of Public Works.

GENTLEMEN: Herewith your Engineer respectfully presents his Eighth Annual Report, or for the year ending March 31st, 1869.

As usual, the first subject in order is the

REPORT OF THE ENGINEER OF THE PUMPING WORKS.

PUMPING DEPT. WATER WORKS,
CHICAGO, Oct. 1st, 1869.

E. S. CHESBROUGH, ESQ., *City Engineer.*

SIR: I submit herewith my Fifteenth Annual Report of the operations of this department, the same being for the year ending March 31st, 1869.

The total quantity of water pumped during the past year was 5,374,624,576 gallons, being an increase of nearly 1,143,000,000—or, say, 27 per cent. over that pumped the previous year. The daily average pumped during the past year was nearly 14¾ million gallons. The year previous, the same average amounted to about 11½ million gallons.

The following record will exhibit the aggregate operation of the works each month during the year.

OPERATIONS OF ENGINES AND BOILERS.

MONTHS.	No. of Days.	No. of Hours Run per month.	Average No. of Hours Run per day.	Total Revolutions per month.	Average No. of Revolutions per day.	Total No. of Gallons Water Pumped per month.	Average No. of Gallons Water Pumped per day.	Total Pounds of Coal consumed per month. FOR PUMPING.	Average Pounds of Coal consumed per day. FOR PUMPING.
1868.		H. M.	H. M.						
April, ...	30	719 00	23 58	411,846	13,728	376,430,083	12,547,670	949,080	31,636
May, ...	31	742 07	23 56	428,493	14,145	402,382,583	12,980,083	925,750	29,863
June,.............	30	718 40	23 57	506,216	16,874	422,909,052	14,096,968	869,670	28,989
July, ...	31	742 02	23 57	682,780	22,025	505,513,404	16,306,833	1,205,960	38,902
August,...........	31	717 45	23 09	582,661	18,793	482,160,940	15,553,578	1,159,490	37,402
September, ...	30	719 18	23 58	488,607	16,287	447,213,481	14,907,116	1,121,260	37,375
October, ...	31	744 00	24 00	452,990	14,612	456,278,707	14,718,668	1,102,910	35,578
November, ...	30	718 13	23 57	593,073	19,769	430,887,264	14,362,908	1,086,340	36,211
December, ...	31	738 00	23 48	596,542	19,243	466,284,049	15,041,421	1,168,370	37,689
1869.									
January, ...	31	742 55	23 58	454,207	14,330	457,504,543	14,758,082	1,155,480	37,274
February, ...	28	671 50	23 59	555,351	19,834	418,212,220	14,936,151	1,057,110	37,754
March, ...	31	744 00	24 00	713,085	23,002	508,848,250	16,414,460	1,295,530	41,791
Totals, ...	365	8717 50	286 37	6,465,851	212,642	5,374,624,576	176,623,938	13,096,950	430,464
General Average per month,..	...	726 29	23 53	538,821	17,720	447,885,382	14,718,662	1,091,412	35,872
General Average per day, ...	...	23 53	... ..	17,715	......	14,724,999	....	35,608	......

NOTE.—Heating the Building, &c., from October to May, is included in the above Coal.

It will be seen by the foregoing table that the pumping machinery has been in operation almost constantly. The total actual running time being $8717\frac{50}{60}$ hours, an average of $23\frac{53}{60}$ hours per day for the whole year.

During the year there has been received the following amount of Coal :

	TONS.
On hand, April 1st, 1868	$163\frac{1500}{2000}$
Rec'd of "Willow Bank"	$4,723\frac{1030}{2000}$
" " "Chippewa"	$950\frac{320}{2000}$
" " Brier Hill	$816\frac{210}{2000}$
" " Wilmington	$147\frac{640}{2000}$
" " Pittsburgh	$161\frac{1590}{2000}$
" " Lackawanna	$106\frac{1390}{2000}$
" " Erie	$49\frac{1910}{2000}$
" " Illinois	$45\frac{1240}{2000}$

	TONS.	
Of these amounts, there has been used for pumping, keeping steam, heating buildings, etc.	$\$6,584\frac{1150}{2000}$	
For work shop, pipe-laying, new inlet and other uses	$438\frac{680}{2000}$	
On hand, April 1st, 1869	142	
	$7,164\frac{1830}{2000}$	$7,164\frac{1830}{2000}$

The expenses due to pumping during the past year are as follows :

Salaries of Engineers, Firemen, and others	$13,064 12
$6548\frac{950}{2000}$ tons coal, at an average of $7.60 per ton,	49,768 56
540 gallons of oil	812 28
735 pounds of tallow	98 23
1306 " cotton waste	171 40
Packing	178 92
Small stores	399 88
Gas for lighting works	324 07
Repairs to engines and boilers	2,107 99
Total	$66,925 45
Cost of delivering water, per million gallons	$12 45

The following table will show the quantities of water pumped each month for the past eleven years.

TABLE SHOWING THE QUANTITY OF WATER PUMPED EACH MONTH, FROM JANY. 1, 1858, TO APRIL 1, 1869.

MONTHS.	1858.	1859.	1860.	1861.	1862.	1863.
January	81,538,179	106,905,665	132,284,454	137,651,918	151,971,047	169,900,255
February	69,426,515	106,401,412	130,800,720	142,071,067	168,931,783	158,108,450
March	82,677,463	102,415,983	150,331,680	135,576,447	192,937,942	159,930,404
April	82,600,782	89,994,235	132,930,546	128,371,178	170,081,570	Hereafter the year commences on the first day of April.
May	82,279,920	116,007,263	141,171,078	150,489,168	181,483,032	
June	90,211,505	113,098,416	148,197,024	155,996,352	199,113,518	
July	101,670,736	133,800,336	166,394,640	147,182,793	209,215,872	
August	107,176,652	123.266,556	152,427,690	168,602,494	195,588,295	
September	108,534,540	131,735,847	132,272,202	152,710,186	186,902,888	
October	101,046,605	141,527,040	148,710,195	149,362,166	199,045,045	
November	86,385,840	127,342,018	150,493,248	153,879,648	187,002,720	
December	98,316,722	122,653,139	130,773,075	145,261,272	175,006,027	
Total	1,091,865,459	1,415,147,910	1,716,786,552	1,767,154,689	2,217,279,739	487,939,109

MONTHS.	1863-4.	1864 5.	1865-6.	1866-7.	1867-8.	1868-9.
April	173,519,952	178,013,170	189,131,463	260,207,901	281,904,710	376,430,083
May	193,119,348	201,471,216	212,575,920	278,006,304	282,813,313	402,382,583
June	194,255,701	230,814,576	249,935,040	271,415,472	318,358,925	422,909,052
July	209,332,677	223,227,723	254,045,040	310,687,104	363,322,276	505,513,404
August	217,561,920	257,109,360	255,641,034	299,800,032	375,441,736	482,160,940
September	217,229,652	237,137,038	266,145,900	262,016,784	354,965,654	447,213,481
October	185,678,001	191,542,516	246,406,639	264,920,802	377,585,973	456,278,707
November	176,132,600	165,033,042	200,101,293	224,726.521	350,800.232	430,887,264
December	199,592,696	208,044,966	192,616,708	211,366,383	378,710,850	466,284,049
January	209,884,992	232,131,600	236,844,455	259,410,174	380,912,240	457,504,543
February	176,088,647	189,244,751	227,597,773	257,166,480	380,867,239	418,212,220
March	183,712,268	209,569,260	246,776,084	269,036,652	386,108,511	508,848,250
Total	2,336,108,454	2,523,339,218	2,777,817,349	3,168,760,609	4,231,791,659	5,374,624,576

TABLE SHOWING THE TOTAL QUANTITY OF WATER PUMPED, TOGETHER WITH ANNUAL AND DAILY INCREASE.

ALSO THE GREATEST DAILY AVERAGE FOR A SINGLE MONTH FOR THE FOLLOWING YEARS:

YEARS.	Total Quantity Pumped.	Annual Increase.	Average Daily Quantity Pumped.	Average Daily Increase.	Greatest Daily Average.	
	GALLONS.	GALLONS.	GALLONS.	GALLONS.	MONTH.	GALLONS.
1858	1,091,865,459	....	2,991,413	....	September	3,617,818
1859	1,415,147,910	323,282,453	3,877,119	885,706	October	4,565,388
1860	1,716,786,552	301,338,642	4,703,525	826,406	July	5,367,569
1861	1,767,154,689	50,368,137	4,841,520	137,995	August	5,438,790
1862	2,217,279,739	450,125,050	6,074,739	1,233,219	July	6,748,899
1863	2,336,108,454	118,128,715	6,400,298	325,559	January	6,770,483
1864	2,523,339,218	187,230,764	6,913,259	512,961	August	8,293,850
1865	2,777,817,349	254,478,131	7,610,459	697,200	September	8,871,530
1866	3,168,760,609	390,943,260	8,681,536	1,071,077	July	10,022,164
1867	4,231,791,659	1,063,031,050	11,562,273	2,880,737	March	12,455,113
1868	5,374,624,576	1,142,832,917	14,724,999	3,162,726	March..	16,414,460
Average for 11 years	2,601,879,656	418,175,912	7,125,557	1,173,359		8,051,460

In former reports the operations of each engine were detailed in separate tables, but as two or more engines are now required to run together, the full details are aggregated in one table; such portions of the operations of each engine as can be separated are given in the following table.

Hitherto the engines have been known as "Old," "Large," and "New" Engines. The first was erected in 1853, the second in 1857, and the last in 1867. They will hereafter be designated as "'53," "'57" and "'67," respectively.

OPERATIONS OF ENGINES.

ENGINES.	Hours and Minutes. H.	M.	Total Revolutions.	Total Gallons Water Pumped.
'53,......	2,223	13	1,275,361	661,657,287
'57,......	4,489	15	2,693,745	2,198,095,920
'67,......	4,197	10	2,496,745	2,514,871,369
Totals,...	10,909	38	6,465,851	5,374,624,576

SHOPS.

During the year just closed, 231 new fire hydrants have been manufactured, in addition to a number of old ones repaired.

One hundred and seven new stop-valves have been made, viz:

47 four inch,	19 eight inch,
35 six "	6 sixteen "

In addition to the foregoing work, a number of drinking hydrants have been made, besides the usual work, and repairing for Street department, bridges, Washington street tunnel, and other departments.

In the Carpenter shop all the boxes necessary for hydrants and stop valves are constructed, and such other woodwork done as may be required.

There is but little available room in the vicinity of the carpenter shop for stowing lumber. A portion of the old inlet basin would afford ample room, if properly arranged. I would therefore recommend that a few piles be driven parallel with east line of "old Inlet," and the space filled in, for the purpose of a lumber yard.

New tools and permanent fixtures have been added to the shop during the past year, costing $2,500.00, making the total value of tools, patterns, etc., $4,300.00. Estimating the value of the work turned out of the shop at considerably less than current prices, and allowing 8 per cent. for interest on cost of tools, etc., 4 per cent. for depreciation of same, and $500 for superintendence, the nominal net earnings of the shop for the year amount to $2,330.97.

There are remaining on hand, of

New Fire Hydrants	29
Four inch Stop Valves	12
Six " " "	11
Eight " " "	6
Sixteen " " "	5

The value of these, together with the raw material on hand at the beginning of the year, amounts to $5,270.24.

The machinery is in fair running order. The repairs done the past year were principally upon the old boilers.

Through the demolition of the south boiler-room and smoke chimney in May last, we were deprived of the use of the two boilers there located. During the balance of the year the largest of the two north boilers was necessarily in use almost constantly, the old boiler being too small to supply steam when using two engines. The latter, however, was used occasionally on a Sunday with one engine only while cleaning the former.

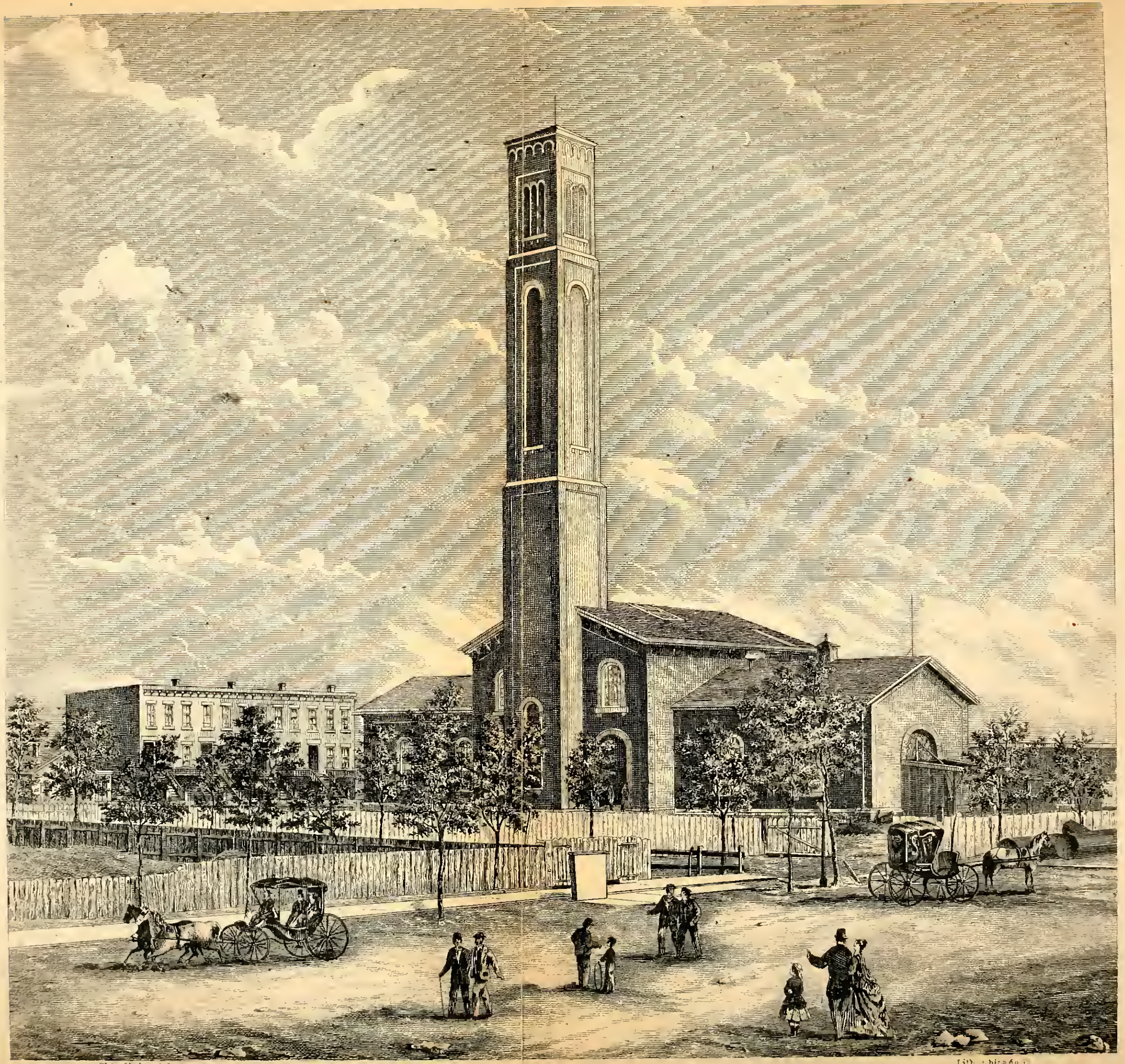
After removing the old south chimney, boiler-house and boilers, preparations were made to construct the new south well-curb, alluded to in the last annual report. The building of this curb, and sinking to place, occupied the time from 6th of July until the 16th of Oct. following. The completion of the walls of the south wing of the new building, as well as those of the south boiler-house, were delayed until after the sinking of the well-curb, owing to the danger they would be liable to otherwise. However, these walls were completed the past winter and spring. The south boilers have been repaired and re-set, and a new copper steam-pipe, connecting the engines, attached; the whole having been put in service, and are now in good order.

It will be seen by the tables that engines '57 and '67 have pumped most of the water; '53 has been used during the day in connection with '57, and stopped at night. It will be necessary, however, the coming year, to use two engines both day and night, in which case the full duplication of pumping machinery, which is so essential to a constant and reliable supply of water in our city, will cease to exist. This should not be so, for if we take the average annual increase during the past ten years, the demand during the coming year will equal not less than twenty million gallons daily; but should the increase of the past two years be taken as a guide, the average daily consumption will reach about 22,000,000 gallons, and at times may reach 25,000,000.

Eleven years ago, the city required less than 3,000,000 gallons of water daily. The machinery at that time was in duplicate and comparatively new; each engine was capable of pumping nearly three times the quantity required. The demands upon the engines at that time rendered accident far less liable than at the present. A failure in the supply eleven years ago would have been trifling compared with what it would be to-day. If the figures given be taken as a basis, the difference would be as 3 is to 20; or, may we not say, by way of comparison, as an inconvenience is to a calamity. That a failure to supply the city with water, with the present facilities, may never happen, may be true; it is equally true that when machinery is taxed to its utmost, it is liable to accident, and if of a serious character, a state of affairs as here hinted at would ensue.

In the construction of the new building, provision was made for the erection of an additional engine. The pump well is prepared to receive the foundation, and the engine should be secured as soon as may be practicable.

It has been stated in former reports that illustrations were in preparation to show the character and extent of the work done during the past three years. A portion of these illustrations will accompany this report.



Chas. Shober & Co.

Lith. Chicago.

VIEW OF PUMPING WORKS;

SKETCH OF OLD WORKS.

As I have been in charge of this department of the Works since they were first started, a period of over sixteen years, and in order to more fully contrast the past with the present condition of the Works, it may be interesting, before entering upon a description of the present extension, to note here, briefly, some of the more important events which have occurred during that time, and which have more or less affected the operations of this arm of the Works.

The present pumping works—an exterior view of which will be found on the opposite page—were commenced in the summer of 1852. The pump-well was finished, a portion of the 30-inch inlet pipe was laid towards the lake, and the foundation of the building and tower put in, which closed the work for the season.

During the spring and summer of 1853, the buildings and tower were finished, and several attempts made to put in place the 30-inch wooden inlet pipe, which was designed to extend 600 feet into the lake, and terminate in a crib of timber. The efforts made to complete this work were unsuccessful. The boisterous condition of the lake rendered it difficult to secure the crib in place; the work was therefore finally abandoned, and the water received in the pipe close to the shore.

During the fall of the same year, the "stand-pipe" was put up and the condensing and non-condensing engines were erected. The former was started on the 16th of December, 1853, and the supply of water for the city commenced in February of 1854.

The original pump-well is rectangular, 20×30 feet, and 25 feet deep from floor of engine house to bottom. The walls are of stone, 6 to 7 feet thick. Upon these walls the engines are located.

The buildings were of brick, consisting of the engine-room, 40×50 feet in the clear, and two wings for boiler rooms, each $31\frac{1}{2}\times40\frac{1}{2}$ feet in the clear.

The water-tower was square, composed of brick, 14 feet at base, 11 feet at top, and 136 feet high. The interior was divided by a wall; one part was designed for a smoke chimney, the other for the iron stand-pipe.

The foundation rested upon a bed of sand some six feet below the surface, and at one time the tower leaned from a vertical line 14 inches; it was, however, subsequently, by an ingenious method, made plumb, and remained so until recently taken down. The original pumping machinery consisted of a vertical beam-engine, located on the north side of the building, having a steam cylinder of 44 inches diameter and a stroke of 9 feet, with two single-acting pumps of 34 inches diameter and 5½ feet stroke. This engine has been in use 16 years, and is now running daily. It was built at the Morgan Iron Works of New York, as were also the subsequent engines — one erected in 1857, the other during the year 1867. The non-condensing engine, erected in 1853, was horizontal. It was located on the south side of main building, having a steam cylinder of 18 inches diameter and 6 feet stroke, with one double-acting pump of the same dimensions. This engine was built by H. P. Moses, Esq., of this city. It was removed in the latter part of 1856, and its place occupied by a much larger one, which will be referred to hereafter.

As before stated, the supply of water commenced in February, 1854. During the first four months water was supplied but nine hours per day, and none on Sunday, except in cases of fire. After that, the supply was continued regularly throughout the twenty-four hours.

At this time there were but few water takers, and having no reservoir, the water was allowed to run to waste through numerous fire hydrants, in order to keep the small engine running. (*It is not so now.*) In the early part of 1854, the 12-inch river-pipe at State street was broken by an anchor dragging from a vessel. This accident required the supply for the West Division to be forced through an 8 inch pipe across the river at Kinzie street; and thence via 12-inch pipe across the river at Adams street, for the supply of the South Division. The damaged pipe was taken up for repair. A tunnel in the river was suggested for protection of the pipe; and, as a temporary resort, a large rubber pipe was manufactured in Boston for use until a new iron pipe could be secured; but upon its arrival here, its strength was found totally inadequate for the purpose. It was therefore abandoned. A new wrought-iron pipe, 30 inches in diameter, was subsequently put down at State street crossing, and is still in use.

During the first year the works were in operation, much trouble was experienced from sand being driven through the inlet pipe into the pump well. The mouth of the pipe being located but a few inches under water, near the shore, was exposed to the heavy waves of the lake. The water was frequently cut off from the pump well from this cause, and at times the supply would be affected by an accumulation of drift-wood, leaves, etc., around the mouth of the pipe. On one occasion the water was entirely stopped by a vast number of insects accumulating on the strainer. To protect the inlet pipe from these annoyances, in 1855 the present breakwater was constructed, forming a large basin. This being dredged to a considerable depth, it fully answered the purpose it was intended for, and was in use until the Lake Tunnel was completed.

During the latter part of the year 1854, the reservoir in the South Division was completed and tested. Water was admitted to the tank gradually, but when filled the building yielded under the weight, cracking the walls to such an extent that considerable time was required to repair them; during which the engines were run day and night.

During the year 1855 a portion of the original 30-inch inlet pipe, leading from the lake to the pump well, was found defective, and a new one, 3×4 feet square, made of oak plank, was put in at a greater depth. Considerable difficulty was experienced in doing the work, involving the removal of the east wall of the engine-house, etc.; but when completed it proved far superior to the old one, which was afterward abandoned. Upon completion of the Lake Tunnel, this aqueduct was also abandoned, and now serves as a waste pipe for the water delivered from the air-pumps of the several engines.

During the early part of 1856, the quantity of water used in the city was nearly equal to the maximum capacity of the high-pressure engine; it was found necessary, therefore, to replace it by a much larger engine. Accordingly, a contract was made with the Morgan Iron Works of New York for the construction of the present south engine, which was set up and put in operation in July of 1857. This engine is similar in construction to the condensing engine previously referred to; it has a steam cylinder of 60 inch diameter, with a stroke of 10 feet; there are two single acting pumps, each 40 inches diameter and 6¼ feet stroke.

Considerable difficulty was experienced in preparing a foundation for this engine, as it was to occupy the site of the high pressure engine and a portion of the only pump well then built, and from which the supply for the city must be pumped. However, the high-pressure engine was removed to a temporary site and so arranged that it might be used for supplying until the completion of the new one.

The work of setting the stone was carried on during the night only. While constructing this foundation no water could be admitted to the well. This work occupied a number of nights, during which, as before stated, the supply to the city was cut off. However, the daily supply was uninterrupted, and the reservoir in the South Division was kept full at night, which, in the event of a fire in the city, was immediately admitted into the mains for the use of the Fire Department.

In the summer of 1857, a 24 inch main was laid from the Pumping Works to the West Division, crossing the river at Chicago avenue, with a wrought iron pipe. Soon after it was completed, the river portion was rendered useless for a time by a pile 12 inches diameter having been accidentally driven through it, permitting the water to flow in the river. From this accident, the engine narrowly escaped serious injury by the sudden and unexpected reduction of load. The damaged pipe was taken up, repaired, and placed in its original position, where it yet remains in use.

In 1858, two new reservoirs of half a million capacity each were erected in the North and West Divisions, respectively. The use of these reservoirs had a favorable effect upon the operations of the pumping works as well as upon the uniformity of the supply. The average daily quantity of water used in the city during this year was less than 3,000,000 gallons.

From this period up to 1863, the operations of the works were of an uniform and satisfactory character, nothing worthy of note occurring, except the construction of two brick chimneys to take the place of the iron smoke-pipes hitherto used for the boilers, and the annual trouble, annoyance and danger to the mouth of the inlet pipe by vast quantities of small fish and floating ice, which frequently, during cold weather, threatened to cut off the supply of water from the pump well.

During 1863, the daily average consumption of water reached nearly 6,500,000 gallons, and at certain periods a greater quantity. In view of this rapidly increased demand upon the works, it was believed that steps should be taken at an early day to augment the pumping facilities.

NEW WORKS.

The dimensions of the old building, pump well and foundations would not admit of the erection of additional machinery. It became necessary, therefore, to provide both a new engine, foundation, and pump well; this would involve the gradual *razeeing* of the old building and erection of new and more commodious ones. This course was under consideration in 1863. Information was sought for and obtained from various sources, calculated to assist in executing the plans for the proposed extension.

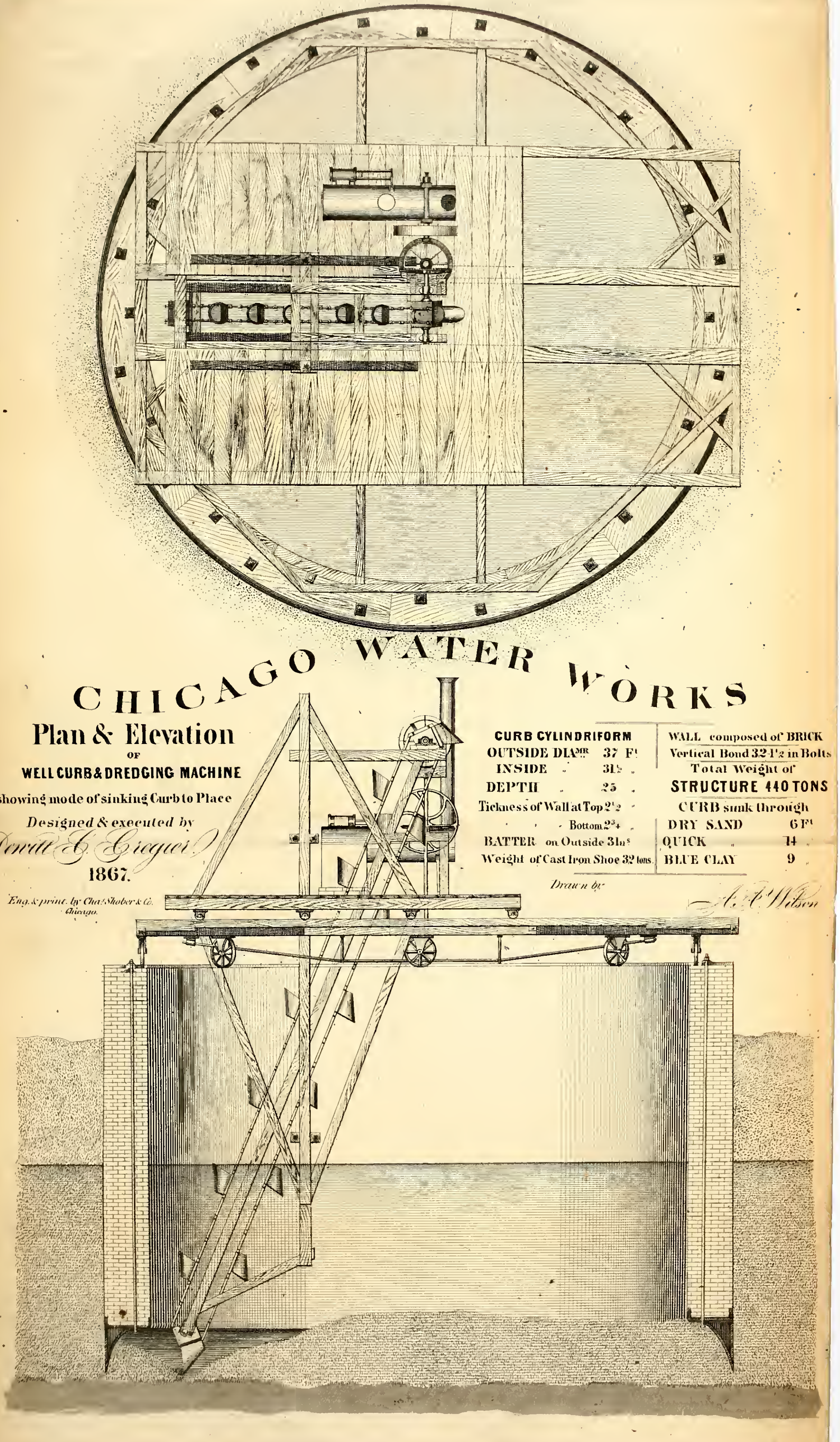
Plans and specifications for a new engine, boiler, &c., were prepared early in 1864, and after receiving the approval of engineers of prominence both at home and abroad, they were submitted to the Commissioners of the Board of Public Works, then consisting of J. G. Gindele, F. Letz, O. J. Rose, Esqs., and Hon. F. C. Sherman, the Mayor, by whom the plans for the engine were adopted. Proposals were invited, and in July of the same year the contract for its construction was awarded to George W. Quintard, proprietor of the Morgan Iron Works, N. Y. City.

To provide the necesssary foundation and buildings for new machinery, two plans suggested themselves; the first was to attempt to construct a pump well, foundations, &c., and locate the engine upon the site then occupied by the North boiler room. To construct the pump well, required excavations to a depth of at least 25 feet below the surface, the greater portion being quick sand, and within 12 feet of foundations of one of the present engines. Considering the nature of the soil at this point, and the proximity of this work to the water tower, the walls of the old building and to the engines, upon all of which the city must depend for supply, and in view of the importance of keeping the means of supply amply secured against accident, the work was regarded as somewhat hazardous to undertake in an ordinary way.

The second plan provided for the construction of engine foundations and the erection of new buildings entirely independent of the old works, and at a sufficient distance west of them to obviate most of the dangers alleged against the first. Notwithstanding this, however, there were objections to this latter plan of so important a character that it was entertained with but little favor. It contemplated the removal eventually of both the old engines to the new site. This would have involved a much greater expense and far more time than the proposed extension of the old site, and promised less satisfactory results when completed. It was therefore thought best to reconsider the first plan and adopt such measures in carrying it out that the operations of the present works would not be interfered with during its progress; accordingly, the preliminary work of removing the north boiler and brick smoke chimney, also the wall of main building, the entire boiler house and a portion of the water tower, was commenced on the 19th of March, 1866. Upon the site thus prepared the following plan was adopted, viz: a pump well or curb was built upon the surface of the ground and afterwards sunk to the depth required.

NEW PUMP WELL.

The form of the curb and the mode of sinking it is illustrated on the page opposite, which shows a sectional elevation. The curb is circular in form, 31½ feet internal, 37 feet external diameter, and 21 feet deep, the wall 2¾ feet thick at bottom, and 2½ feet at top, giving a batter on the outside surface. The wall is built of selected hard burnt brick, laid in Louisville cement and sand, composed of one part of the former to two parts of the latter. The surface inside and out is plastered with two coats of the same composition. The wall is bonded with band iron laid parallel to its circumference, every 3 feet in height. The base of the wall rests upon a cast iron shoe weighing 32 tons, made in 8 segments firmly secured at each joint with bolts and keys. The



CHICAGO WATER WORKS

Plan & Elevation
OF
WELL CURB & DREDGING MACHINE
showing mode of sinking Curb to Place
Designed & executed by
Dewitt C. Cregier
1867.

Eng. & print. by Cha^s Shober & Co. Chicago.

CURB CYLINDRIFORM		**WALL composed of BRICK**	
OUTSIDE DIA^{MR}	37 F^{t}	Vertical Bond 32-1½ in Bolts	
INSIDE „	31½ „	Total Weight of	
DEPTH „	25 „	**STRUCTURE 440 TONS**	
Tickness of Wall at Top 2½ „		CURB sunk through	
„ „ Bottom 2¾ „		DRY SAND	6 F^{t}
BATTER on Outside 3In^{s}		QUICK „	14 „
Weight of Cast Iron Shoe 32 tons.		BLUE CLAY	9 „

Drawn by A. A. Wilson

shoe is 2¾ feet wide at top, the exterior is uniform with surface of wall, the interior tapering through a curve to a sharp edge at bottom, a distance of 2½ feet. There are 32 1½ inch bolts placed in zigzag position 3½ feet apart throughout the circumference, extending from the under side of the shoe through the body of the wall and terminating on top of 5 inch oak coping. These vertical bonds are secured at either end by nuts, washers, &c.

The structure is located at a point which brings a portion of it within 12 feet of the foundation of one of the present engines; the bottom of it is 20 feet below the present surface of the lake, and 9 feet below the bottom of old well; its weight while sinking was over 500 tons. The curb was completed and ready for sinking on the 23d of June, 1866. As before remarked, the ground through which the curb had to pass during the process of sinking, is of a very troublesome character, most of it being quick-sand. It was therefore apprehended that some trouble might ensue from the caving of the sand and water surrounding the outside of the curb, due to the preponderance of head created by the removal of sand and water from inside, and thereby greatly increase the danger to the adjacent building. With this view, and in order to diminish as much as possible any danger from this source, it was determined to excavate the interior without removing the water until the clay formation was reached; for this purpose a dredging machine was designed, especially adapted to the work, and although a rudely built affair it answered the purpose admirably. The machine is shown in the elevation illustrated on preceding page; it consists of a main platform with wheels attached, resting upon the top of curb and arranged to traverse its entire circumference. Upon the main platform a supplemental carriage is placed, having wheels to traverse the diameter of curb; to the latter is connected the machinery for excavating, consisting of two endless chains, to which are attached 14 iron buckets having a capacity of about ¾ cubic foot each. Square timbers placed at an angle extend from bottom to top of curb. The chains carrying the buckets pass over a *square* casting attached to top and bottom of these timbers. The motive power was derived from a small steam engine, transmitted through gearing to the chain of buckets. The whole was so arranged that the buckets could be long, 5½ feet wide, and 21½ feet from bottom to the point where the bed-plates are located; from thence piers 4½×5½ feet, and 3×5½ feet, respectively, are built, upon which rests the upper foundation plate. The first stone of the foundation was set October 6th, 1866, and the foundations were completed on the 29th of November following.

The work of erecting the engines was immediately commenced, and continued until they were completed. However, owing to the delay in completing the building, the engines were not put in operation until the 20th of July, 1867, and with some slight alteration, referred to in former reports, they have continued to perform in a satisfactory manner. The work upon the engines, both as regards strength and finish, are of the most satisfactory character; the various parts coming together without trouble or mistake, notwithstanding the unusual formation of many of the large pieces. The fly-wheel, in particular, is a masterpiece of mechanism. It is 24 feet in diameter and weighs 25 tons. It is composed of 8 *double* segments in the run; 8 tuscan columns form the arms; the hub is composed of one piece; the unsightly bolts and nuts, usual in a wheel of the kind, are not to be seen. The whole surface of the rim, arms and hub having been *turned* smooth and bright.

Much credit is due Mr. Geo. W. Quintard, the contractor, for a liberal construction of the specifications, as well as to his General Superintendent, Edward Faron, Esq., for the lively interest manifested by him in all the details of the work; also, to Mr. Albert Becher, chief draughtsman, for the accuracy of the working drawings, and to Mr. William P. Cox for the skill exhibited by him in the fitting and erection of the engines.

A general description of these engines was given in the Third Annual Report of the Board. It is deemed unnecessary, therefore, to repeat it here, further than to say they are constructed substantially the same as described in the report referred to, as will be seen by reference to the illustration on the next page.

CHICAGO WATER WORKS.

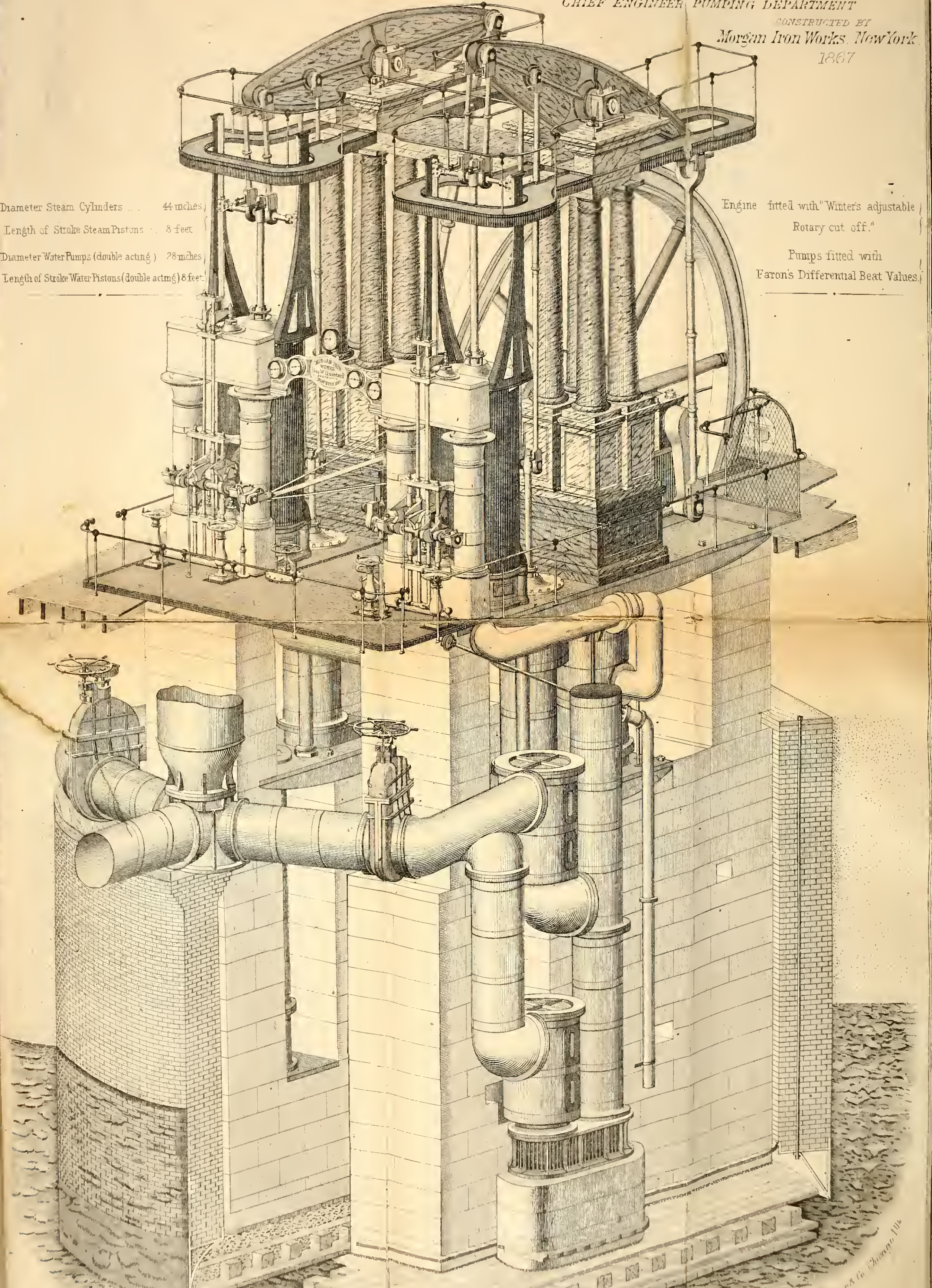
DOUBLE (COUPLED) PUMPING ENGINE.

DESIGNED BY

DEWITT C. CREGIER.

CHIEF ENGINEER PUMPING DEPARTMENT

CONSTRUCTED BY
Morgan Iron Works. New York.
1867



Diameter Steam Cylinders ...	44 inches
Length of Stroke Steam Pistons ..	8 feet
Diameter Water Pumps (double acting)	28 inches
Length of Stroke Water Pistons (double acting)	8 feet

Engine fitted with "Winter's adjustable Rotary cut off."

Pumps fitted with Faron's Differential Beat Values.

ELEVATION SHOWING WELL CURB, BOTTOM, FOUNDATIONS AND ENGINE

Lith by Chs. Shober & Co Chicago Ills

THE WORK OF ERECTING THE NEW BUILDING On the old site, and which forms so important a feature in the extensive improvement, has been quite tedious, owing to the care necessary to guard against accident to the operation of the works. Portions only of the old wall could be removed and rebuilt at a time. However, the buildings are now so nearly completed that a description of them may be given.

The plan and dimensions of the new buildings provide ample room for the present machinery as well as for additional engines.

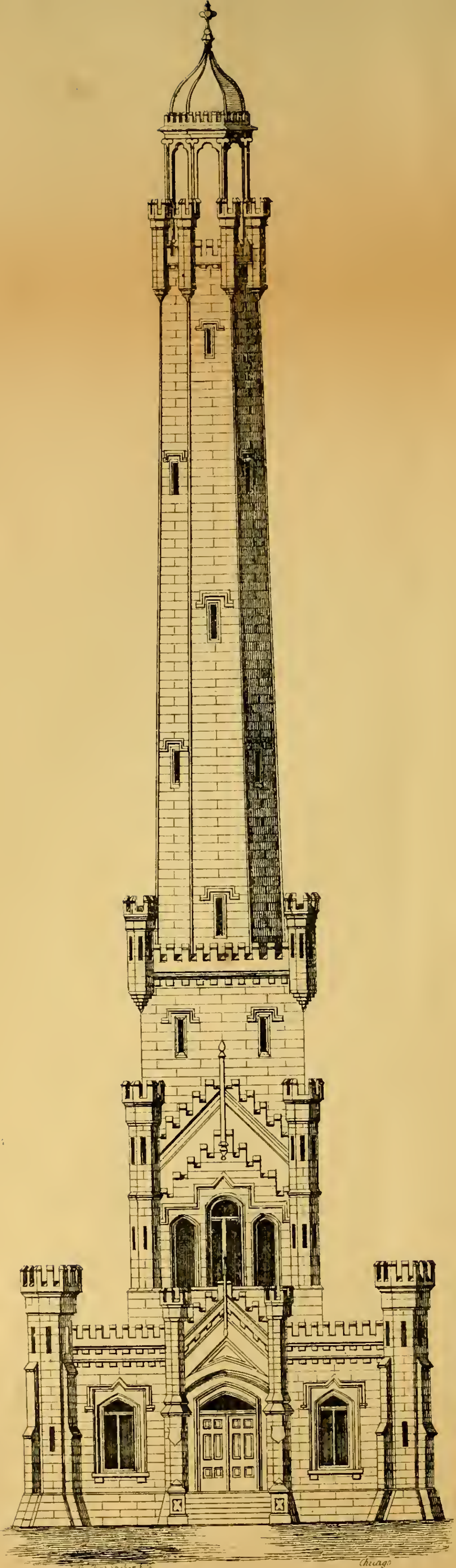
The style of architecture is *Castellated Gothic* with heavy battlemented corners, executed with solid rock-faced ashlar stone and cut stone trimmings; all the detail being of a massive and permanent character.

The dimensions of the engine room are 142 feet long, 60 feet wide, and 36 feet in the clear from main floor to ceiling. A projection of 24×56 feet forms the center of the main front. This portion is divided into two stories. The upper part is devoted to drawing rooms and sleeping apartments for the engineers. The lower part is divided by the main entrance, the floor of which is tiled. On the south side of the vestibule is a large room designed for Commissioners' or reception room. On the north side are offices and other conveniences for engineers. All the walls are 2 feet thick. The walls of the interior of the main building are rough cast, blocked off representing cut-stone work. The ceiling is divided into square panels, formed by projecting moulded purlins, supported by large gothic brackets resting on heavy corbels built in the wall. The roof of the main building is constructed of massive timbers, covered with slate and pierced with the necessary ventilators, &c. Midway between floor and ceiling and extending around the entire interior space of the building, there is a handsome and substantial gallery or balcony, protected by fancy gothic iron railing, the whole resting upon brackets of like style built into the walls. From this point a pleasing view of the operations of the engines is obtained. This gallery is reached by two flights of spiral stairways constructed entirely of iron. Below the main floor of principal building there is a space extending over the whole area and 9 feet high in the clear. Here are located the pumps, delivery mains, stop-valves, &c., of the several engines, also store rooms and other conveniences. From the floor of this large room the pump-wells connected with the Lake Tunnel descend. The north well and the center or old well have already been described. The south well, intended for additional engines as before stated, was sunk to place in October last. The form and construction of this curb, as well as the mode of sinking it to its place, is similar to that adopted for the north well already described; it is, however, larger. The outside diameter is 44⅛ feet at the bottom, 43⅛ feet at the top, and 22 feet from the top of the cast iron shoe to the top of the coping. The outside has a batter of 6 inches. The vertical bond consisted of 48 1½ inch bolts.

The Boiler rooms are placed 19 feet apart, and are located in the rear of the main building. They are 46½ feet long, 36 feet wide, and 25 feet from the floor to the ceiling. The floor is of stone and the roof is wholly of iron and slate, thus rendering them fireproof. The buildings throughout are heated by steam, and are amply lighted, ventilated and drained.

A single smoke-stack is placed between the two boiler rooms; the north and south side of the base forms a part of the wall of the boiler room, and are so arranged that the boilers in both rooms are connected with it 20 feet above the floor. The lower part is constructed with a large opening east and west, forming a vestibule or main passage from the rear part of the main building. The base of the smoke stack is 18 feet square to a point 30 feet high; from thence it is octagon with a gradual taper, terminating in a castellated cornice 130 feet from the ground. The exterior is stone, corresponding in style to the buildings. The interior has a parallel circular flue built of brick, which is built independent of the stone work, thus forming an air space between the two. The whole structure rests upon piles driven into the clay. An illustrated elevation of the buildings and smoke-stack will be found on the opposite page.

(*For this illustration, see Frontispiece.*)



Lith. Chas. Shober & Co. Chicago

TOWER

THE WATER TOWER

Is the most imposing feature among the whole mass of buildings comprising the works, and is without doubt the most substantial and elaborate structure of the kind on this continent. Its center is 106 feet west of the main buildings, upon ground purchased for the purpose in 1865; 168 piles capped with 12 inch oak timbers, the spaces filled with concrete, constitute the foundation up to the surface of the water; from thence to a point 6 feet below grade, solid massive dimension stones, laid in cement, intervene. At this point the gate, pit and arched ways on each corner for mains are formed. The base of the tower is 22 feet square. The exterior of the shaft is octagonal, and rises 154 feet from the ground to the top of the stone work which terminates in a battlemented cornice. The whole is surmounted by an iron cupola, (not yet finished,) pierced with numerous windows, from whence may be obtained a magnificent view of the lake, the city and surrounding country. The exterior of the tower is divided into five sections. The first section is 40 feet square, exclusive of battlements, turrets, &c., and surrounds the base of the shaft, forming a continuous vestibule 9 feet wide on the four sides, with a grand entrance on each side. The floor and roof of this portion is of massive stone. The roof forms a balcony. The walls are plastered and blocked off like those of the engine room. The ceiling is groined and corniced, and the sides are ornamented with tablet drinking fountains, &c. The other sections of the exterior recede from each other in graceful proportion, each having turreted cornice, battlements, &c.

The bottom of the interior is hexagonal; here the base piece of stand pipe (a casting, weighing 6 tons) is placed, having 6 openings supplied with 30 inch gates, to which the water mains are connected. From this base a 36 inch wrought iron stand pipe ascends to a height of 138 feet; around this pipe is an easy and substantial iron spiral stairway, leading to the cupola on the top, and lighted throughout with alternating windows.

The whole structure is thoroughly fire-proof, being constructed wholly of stone, brick and iron. This tower is illustrated on the opposite page.

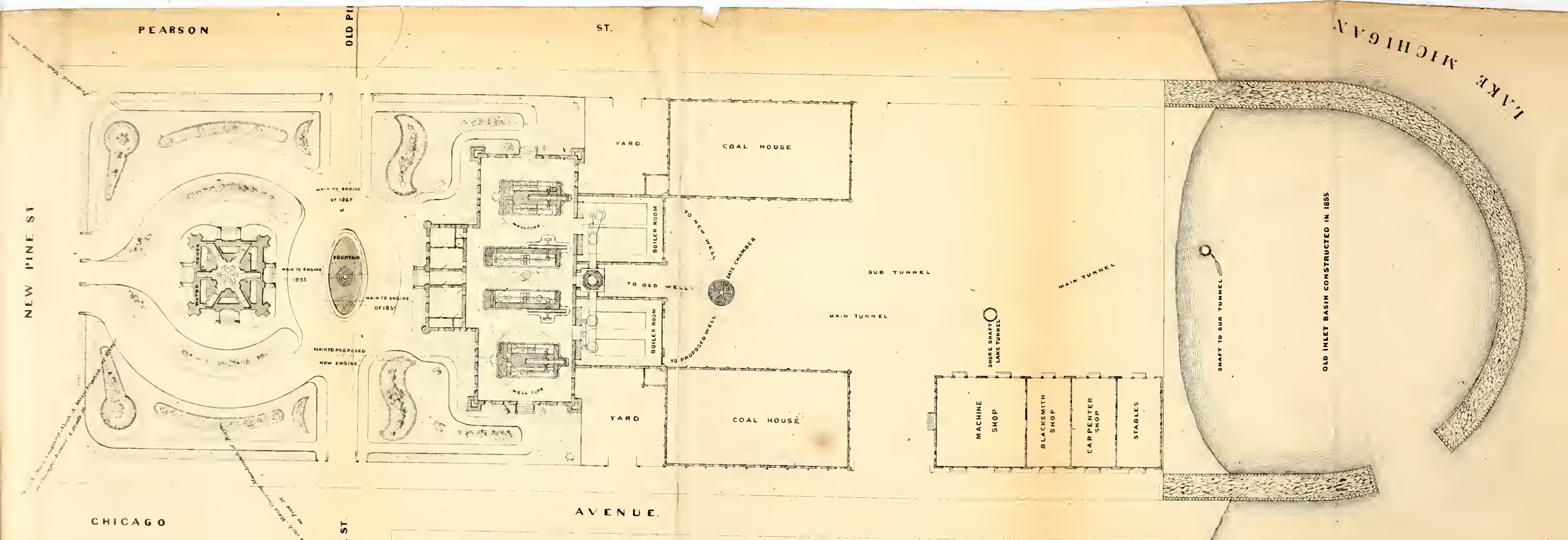
THE GROUNDS

Are bounded by Chicago Avenue, Pine Street, Pearson Street and the Lake. They have a frontage on Pine Street of 218 feet, and extend from the lake west a distance of over 571 feet. These grounds are not yet fenced or laid out, but the illustration on the following page shows the proposed improvement, which is in keeping with the general character of the buildings, &c.

The foregoing gives but an imperfect idea of the vast amount of work which has been done upon these premises during the past four years. The perplexities, anxiety and risk arising during the prosecution of the work cannot well be conveyed in words, but as all that was proposed has been successfully accomplished, the spectator will observe *wisdom*, *strength* and *beauty* everywhere prominent in the designs and execution of the work, which is composed of almost imperishable material, and may last for ages and become a land-mark, visible to the mariner as he approaches the port of Chicago, as well as a prominent object for miles inland. The whole work cannot fail to reflect the highest credit equally upon the Board of Public Works, Messrs. Gindele, Letz and Rose, who adopted the plans and commenced the work; and upon the subsequent Board, Messrs. Burley, McArthur and Carter, who have carried them to completion. To the citizens of Chicago the water works of our city will stand as one of the enduring monuments which so fully characterize their *energy*, *enterprise* and *liberality*.

Much credit is also due to W. W. Boyington, Esq., the architect of the buildings, for the professional skill, taste and judgment displayed in the work entrusted to him. That the plans have been faithfully executed by the various contractors, is demonstrated by the character of the work. The following named gentlemen have been engaged upon the recent extension and improvements:

Machinery, Geo. W. Quintard, New York.
Pump-well, R. E. Moss, Chicago.
Masonry of Buildings and Tower, A. Wallbaum, Chicago.
Carpentry, " " J. Clark & Bro., "
Iron Work " " F. Letz & Son, "



PLAN OF NEW BUILDINGS TOWER AND GROUNDS OF PUMPING WORKS.

Showing Shore end of Tunnels Shafts and Course of the several delivery Mains.

Painting, Graining, &c., Heath & Milligan,	Chicago.
Heating Apparatus, Walworth, Twohig & Furse,	"
Gas Fitting, Nash & Blow,	"

In conclusion, permit me to say, that during the progress of the work for the past four years, those employed in this department have necessarily been subjected to many annoyances and exposures incident to enlargement, rebuilding, &c., among whom may be mentioned Mr. Trautman, who has served as Assistant Engineer for thirteen years. Mr. Faron and Mr. Lewis also have filled like positions for a number of years. There are firemen and others whose term of service covers nearly the whole time since the works were first started, and by faithfulness they have contributed their share to bring *order out of chaos.*

Respectfully,
DeWITT C. CREGIER,
Engineer.

The extraordinary rate of increase in the supply of water, as reported by Mr. Cregier, has been beyond all expectation, and gives rise to most serious inquiries as to how this growing demand is to be met, which will form the subject of a special report to the Board.

INLET BASIN.

This is in about the same condition it was a year ago, but the piles are more decayed. Of several projects for improving or preserving the inlet afforded by the basin, so that it could be used in case of accident or temporary stoppage to the Lake Tunnel, the best seems to be to fill up a portion, at least, of it, and ultimately all except a channel sufficiently wide to supply the city in case of need. This can easily be done the present season. When done, it will afford more room for the storage of lumber and other articles, the necessity for more space on this account being a growing one.

DISTRIBUTING PIPES.

There were laid during the year ending March 31st, 1869, the following main and distributing pipes, viz:

SOUTH DIVISION.

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Archer avenue.	Reuben and Market square	590	6
Alexander st...	Buddan and Stewart av	630	4
Burnside st....	Twenty-seventh and Thirty-third	3690	4
Bushnell st.....	Wentworth av. and westward	2100	4
Butterfield st...	Archer av. and Nineteenth	440	4
" "	Twenty-seventh and Thirty-third	2550	4
Butler st.......	At intersection of Twenty-fourth st	50	4
Calumet av....	Twenty-second and Thirty-third	680	6
" "	Twenty-fourth and Twenty-fifth	685	6
Ellis av........	Wahpanseh and Egan avs	1570	4
Egan av.......	Ellis and Lake avs	500	6
Franklin st.....	Adams and Harrison sts	1800	6
Farrell st......	Archer av. and Hickory st	930	4
" ".....	Lyman and South	790	4
Halsted st......	Archer av. and Twenty-sixth	740	6
Hickory st.....	Main and Deering sts	1200	4
Indiana av.....	Thirty-third and Thirtieth sts	1352	6
Kankakee av ..	Twenty-second and South	50	6
Lime st.......	Archer av. and Waver st	412	4
Lake av........	Oakwood and Wahpanseh	1516	4
Langley st.....	Wahpanseh av and South	870	4
Lyman st......	Main and Farrel	395	6
Main st...	Archer av. and Thirty-first st	2000	6
McGregor st....	Wallace and Sanger	790	4
Myrick av.....	Twenty-ninth and Thirty-second	1340	4
Prairie av......	Twenty-ninth and Thirty-first	1363	8
Purple st.......	Nineteenth and Twentieth	440	6
Rhodes av.....	University pl. and Northward	356	6
State st.... ...	Twenty-ninth and Thirty-second	2080	8
Sanger st.......	Twenty-sixth and northward	79	6
"	McGregor and Southward	370	6
Twenty-ninth st	State st. and Prairie av	1800	8
"	State and Clark	700	6
Twenty-fourth .	At intersection of Wabash av	100	4
"	Hanover and Butler	480	4
"	Hanover and Stewart av	560	6
Thirty-first st...	Butterfield and east of State	750	8
" ...	Wabash av. and westward	114	8

SOUTH DIVISION.—CONTINUED.

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Thirty-second st	State st. and eastward	70	8
Twenty-second.	Calumet and Kankakee avs	470	6
Twenty-fifth st.	Calumet and Prairie avs	450	6
"	Wabash and Michigan avs	475	6
Thirty-third st .	At intersection of Burnside	147	6
Twelfth st	Clark st. and South Branch	1000	16
Tyler st	At intersection of Franklin st	190	4
Twenty-sixth st	State and Halsted	5400	8
University place	Cottage Grove and Rhodes avs	816	4
Washington st.	Franklin and Market	800	4
Wentworth av.	Nineteenth and Twentieth	440	4
"	Bushnel and northward	218	4
"	Bushnel and Twenty-sixth	1800	6
Wabash av	Twenty-sixth and Thirty-second	3500	6
Wahpanseh av.	Ellis and Langley	884	6
Wallace st	McGregor and Twenty-sixth	1067	6
	Hydrants	1261	4
	Total	55,850	

WEST DIVISION.

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Aberdeen st	Harrison and Tyler	285	4
Baldwin st	Hubbard and Kinzie	400	4
Bawans st	Blackhawk and Reuben	925	4
Bunker st	Canal and Beach	475	4
Bunker st.	Halsted and Desplaines	900	4
Belknap st	Morgan westward	275	4
Bishops Court.	Madison and Washington	525	4
Burlington st.	Sixteenth and Eighteenth	890	4
Canalport av	Halsted and John	550	6
Coolidge st	Blue Island and Centre avs	765	4
Catherine st	Stewart av. and Canal	590	4
Carpenter st.	Madison and Washington	520	6
"	Lake and Fulton	445	6
Center av	Blue Island av. and Sixteenth	1350	6
"	Taylor and southward	174	6
"	Jackson and Van Buren	485	6
"	Evans and south of Twenty-second	1335	6
Carrol st	Reuben and Paulina	670	4
"	Extension to River for use of "Tugs"	130	4
"	Hoyne and Leavitt	765	4
"	Jefferson and Clinton	440	4
Clinton st	Harrison and South	40	6
Cornelia st	Noble and Reuben	1340	4
Desplaines st	Twelfth and Harrison	2704	8
Dekoven st	Beach and Canal	480	4
Eighteenth st	Arthur and Lumber	200	4
"	Jefferson and Union	800	6

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Ewing st.	From Halsted west	130	4
Erie st.	End of pipe and Centre av.	230	4
First st.	Wood and Paulina	660	4
“	Noble and Reuben	1360	4
Fulton st.	May and Curtis	354	4
“	Hoyne and Leavitt	730	4
Frank st.	Blue Island av. and Waller	1070	4
Fourth st.	Halsted and Green	350	6
Green st.	Lake and Kinzie	1236	4
“	Van Buren and Tyler	450	4
“	Third and Pratt	700	6
George st.	Carpenter and Grover	500	4
Halsted st.	Harrison and Sebor	300	4
“	Twenty-second and Lumber	890	6
Harrison st.	Morgan and Silver	580	8
“	End of pipe and Center av.	260	6
“	Clinton and Desplaines	740	8
Honore st.	Jackson and Van Buren	495	6
Hoyne st.	From Van Buren north	75	6
Indiana st.	Lincoln and Robey	700	4
John st.	Canalport av. and Walsh	390	4
“	Luke and Evans	516	4
Jackson st.	Hoyne and Seely	380	4
Kinzie st	Wood and Lincoln	700	6
Kansas st.	Throop and Loomis	740	4
Leavitt st.	Hayes School and Kinzie	912	6
Loomis st.	Adams and Jackson	340	6
“	Monroe and Madison	500	6
Lake st.	Carpenter and Morgan	350	6
Luke st.	Centre av. and May	550	4
Luke st.	From Union st. west	50	4
Laflin st.	Monroe and Madison	200	6
Lytle st.	Taylor and Twelfth	880	4
Mark st.	Union and Halsted	550	4
Mitchell st.	Union and Halsted	492	4
“	Blue Island av. and Waller	650	6
“	Blue Island av. and Waller	800	4
Milwaukee av.	End of pipe and Ridgeville Road	2250	6
May st.	English and Evans	1550	4
“	Hubbard and Kinzie	490	4
“	Fulton and Carrol	390	6
“	Gurley and Harrison	500	4
“	Chicago av. and Second	527	6
“	Lake and Randolph	480	6
Madison st.	Western av. and Oakley	616	8
Monroe st.	Loomis and Reuben	930	4
“	End of pipe and Leavitt	360	4
Maxwell st.	Canal and eastward	345	6
“	Blue Island av. and Waller	979	6
Morgan st.	Twelfth and Sixteenth	2672	8
Margaret st.	Mitchell and Henry	416	6
Meagher st.	Canal and Jefferson	850	4
“	Halsted and Union	500	4
Newberry st.	Wright and southward	650	4
Nebraska st.	Throop and Laflin	1380	4
Nutt st.	Sixteenth and Evans	700	4

WEST SIDE—CONTINUED.

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Noble st.......	Hubbard and Kinzie........................	450	6
Peck st.........	Fulton and Depot pl........................	500	4
Peoria st.......	Harrison and Tyler........................	450	4
Paulina st......	Hubbard and Kinzie........................	430	6
Reuben st......	Coolidge and Sampson........................	400	6
“	Carrol and Carrol........................	180	6
Ruble st........	Eighteenth and Northward........................	390	4
Reuben st......	Jackson and Tyler........................	1000	6
“	Milwaukee av. and Bawans........................	450	6
“	Indiana and Hubbard........................	425	6
“	Erie and South........................	418	6
Rumsey st......	Fourth and Indiana........................	540	4
Seventeenth st..	Union and Halsted........................	314	4
Sholto st.......	Polk and Harrison........................	640	4
Sangamon st....	Harrison and northward........................	50	4
“	Hubbard and Kinzie........................	380	4
Second st.......	Milwaukee av. and Carpenter........................	240	6
“	Mark and westward........................	414	4
Sampson st.....	Loomis and Laflin........................	650	4
Sixteenth st....	Morgan and Nutt........................	400	8
“	Halsted and Newberry........................	184	8
“	Halsted and eastward........................	66	8
Twelfth st......	Canal and the River........................	1362	16
Twenty-second .	Centre av. and Canalport av........................	1800	6
Throop st......	Twelfth and Nebraska........................	612	6
Taylor st.......	Canal and Beach........................	478	6
“	Throop and Laflin........................	1150	6
Union st.......	Sixteenth and Eighteenth........................	840	4
“	Twelfth and Sixteenth........................	2150	8
“	Canalport av. and Luke........................	490	4
Van Buren st...	Canal and Clinton........................	414	6
“ ...	Throop and Loomis........................	716	6
“ ...	Peoria and Morgan........................	400	6
“ ...	Hoyne and Seely........................	350	6
“ ...	Centre av. and Loomis........................	850	6
Warren st......	Oakley and Western av........................	790	4
Waller st.......	Twelfth and Mitchell........................	600	6
“	End of pipe and Mitchell........................	716	4
Walnut st......	Wood and Lincoln........................	685	4
“	At intersection of Lincoln........................	73	6
	Hydrants........................	2375	4
	Total........................	81,675	

NORTH DIVISION.

On what Street.	Between what Streets.	Length in Feet.	Diametr in Inches.
Asylum place	Sedgwick and Hurlbut	670	4
" "	Larrabee and Orchard	600	4
Burling st	Willow and northward	1150	4
Clark st	Oak and Chestnut	970	6
Chestnut st	Clark and Dearborn	450	4
Centre st	Sedgwick and Franklin	660	4
Dayton st	Willow and Clay	830	4
Division st	LaSalle and Wells	440	8
Elm st	Clark and eastward	100	4
Fullerton av	Clark and Hurlbut	300	4
Florimund st	Wells and Franklin	640	4
Howe st	Centre and Willow	1623	4
Hurlbut st	Sigel and northward	912	6
"	At intersection of Lincoln av	153	4
Huron st	Rush and Cass	384	6
Hull st	From Linden north	100	4
Halsted st	North av. and Weed	500	6
Hills st	Wells and Franklin	445	4
Lafayette place	Clark and eastward	60	4
Locust st	Clark and westward	65	4
LaSalle st	Kinzie and Michigan	300	4
"	Division and North av	2900	8
Lincoln av	Larrabee and south-east	700	6
"	" "	260	4
Larrabee st	Grove and southward	400	6
Linden st	Hurlbut and Church	430	6
Michigan st	Wells and Kingsbury	920	4
Market st.	Ohio and Indiana	330	6
Maple st	Dearborn and State	390	4
"	Clark and Dearborn	190	4
Oak st	" "	70	4
"	Larrabee and Townsend	800	6
Ohio st	Market and Kingsbury	970	4
Pine st	Hinsdale and northward	300	6
Schiller st	Wells and La Salle	420	6
Sophia st	Lincoln av. and westward	150	6
Washington pl.	Clark and Dearborn	412	4
Willow st	End of pipe and Dayton	120	4
Whiting st	Wells and eastward	260	4
Wendel st	Wells and Franklin	454	4
White st	Market and Sedgwick	500	6
Wells st	From Kinzie southward on both sides	660	4
North Water st.	To connect with Wells st	100	4
	Hydrants	470	4
	Total	23,558	

The total length of pipe laid in the city during the year was 30 miles and 2,683 feet, 440 feet of 6 inch and 6,477 feet of 4 inch pipe was taken up and replaced by pipe of larger size.

The entire length of pipes of different sizes laid in this city to this date is as follows, viz:

		Feet.
28	inch cast iron main pipe	160
24	" " " " "	22,922
16	" " " " "	14,972
12	" " " " "	9,830
30	" wrought iron river pipe, State st	280
24	" " " " " Chicago av	236
24	" " " " " Rush st	530
12	" " " " " Adams st	176
12	" cast iron distributing pipe	844
10	" " " " "	7,862
9	" wrought iron " and syphon pipe, on Archer avenue	90
8	inch cast iron distributing pipe	111,261
6	" " " " "	383,275
4	" " " " "	520,353
3	" " " " "	28,566
		1,101,357

Or 208 miles and 3,117 feet.

The necessity for more large pipe continues to increase.

An attempt was made to construct a tunnel under the river at Twelfth street for the passage of this pipe; but owing to the meeting with unexpected difficulties and the threatening of serious injury to the masonry of the new bridge there, it was thought best to abandon the work done for the tunnel, consisting of the shaft on the east side of the river and about twenty feet of drift westward. Two boiler iron syphons, two feet in diameter, one for each side of the draw, were then made. It is hoped that this connection across the river will be made early in the season.

The plan determined upon by the Board last year of forming a complete circuit of large pipe around the most important part of the city, it is hoped, will be partially carried out the present year by the extension of the 24 inch main on Wabash avenue, southward to thirty-first street, by the laying of a mile of same size on Reuben street, between Madison street and Chicago avenue, and if possible by a connection between the latter point and the

Pumping Works, with a 24 inch pipe crossing the north branch on Division street. It was intended to lay a 24 inch pipe on Reuben street as far south as Harrison street, and then connect with the 12 inch pipe to be laid to that point, but the necessity of making the West Side supply more secure against accidents being so great, it has been decided to omit for the present the laying of this portion, and to use the pipe in the connection northward with the Pumping Works. The 16 inch pipe on Chicago avenue has been already extended to Reuben street. The 16 inch pipe on Twelfth street has been extended part of the way to Reuben street. As soon as the whole of this circuit and the cross connections can be made, the city will be in a far safer and more satisfactory condition with regard to the water supply than at present.

QUALITY OF THE WATER.

This has been, with rare exceptions, excellent. Occasionally, owing to the prevalence of strong easterly winds, there has been a slight milkiness in the color of the water. During the heated term of last summer the temperature of the surface of the Lake rose unusually high, and was then driven westward by a strong wind. This caused a very sudden change in the temperature of the bottom of the Lake at the crib. Many intelligent citizens supposed the Board had commenced supplying the city from the Lake shore again, in order to repair or do something to the Tunnel; but there has been no supply of water to the city except through the Tunnel since this was completed.

HYDRANTS.

During the year ending April 1st, 1869, the following new hydrants were put in, viz:

SOUTH DIVISION.

1 S. W. corner of Archer avenue and Market Square.
1 S. W. " " " Main street.
1 S. W. " " " Mary street.
1 N. W. " Burnside and Thirty-third streets.
1 S. W. " " Thirty-second streets.
1 N. W. " Bushnel street and Stewart avenue.
1 N. W. " " " Buddan street.
1 N. W. " " " Wentworth avenue.
1 S. W. " Butterfield and Twenty-seventh streets.
1 S. W. " " Thirty-first streets.
1 S. W. " Burnside and Twenty-ninth streets.
1 S. W. " " Thirty-first streets.
1 N. W. " Egan and Lake avenues.
1 West side of Ellis bet. Wahpanseh and Egan avenues.
1 N. W. corner of Egan and Ellis avenues.
1 N. W. " Franklin and Tyler streets.
1 N. E. " Grove and Purple streets.
1 East side of S. Halsted south of bridge.
1 North side of Hickory bet. Main and Deering streets.
1 S. W. corner of Hickory and Main streets.
1 N. W. " Indiana avenue and Thirtieth street.
1 N. W. " " " Thirty-second street.
1 S. W. " " " Thirty-third street.
1 West side of Lime street at the R. R. tracks.
1 West side of Lake south of Wahpanseh avenue.
1 S. W. corner of Lake avenue and Oakwood street.

1 West side of Lake bet. Wahpanseh and Egan avenues.
1 S. W. corner of Main and Lyman streets.
1 N. W. “ “ Wrong streets.
1 S. W. “ State and Thirtieth streets.
1 S. W. “ “ Thirty-first streets.
1 At the Engine House on Sanger street.
1 S. W. corner of State and Thirty-second street.
1 N. W. “ Twenty-ninth and Wabash avenue.
1 S. W. “ “ Prairie avenue.
1 S. W. “ Twenty-fifth and Calumet avenue.
1 S. W. “ Thirtieth and Prairie avenue.
1 N. W. “ Thirty-first and Prairie avenue.
1 N. E. “ Twenty-fifth and Prairie avenue.
1 N. W. “ Twenty-fourth and Butler streets.
1 N. E. “ “ “ Stewart avenue.
1 S. W. “ Twenty-second and Kankakee avenue.
1 N. W “ Twenty-sixth and Halsted streets.
1 N. W. “ “ “ Sanger streets.
1 N. E. “ “ “ Butler streets.
1 N. E. “ “ “ Hanover streets.
1 S. W. “ Wallace and Kossuth streets.
1 S. W. “ “ “ Twenty-sixth streets.
1 S. W. “ Wabash avenue and Twenty-fourth street.
1 S. W. “ “ “ “ Thirty-second street.
1 S. W. “ Wentworth avenue and Twenty-sixth street.
1 Ellis Park at north end of Langley street.
1 N. W. corner of Wahpanseh and Cottage Grove avenues.

53 Total in the South Division.

WEST DIVISION.

1 N. W. corner of Arthur and Eighteenth streets.
1 N. E. “ Bunker and Halsted streets.
1 S. W. “ Bawans and Blackhawk streets.
1 N. E. “ Blue Island avenue and Frank street.
1 N. W. “ Bickerdike and Indiana streets.
1 S. E. “ Centre av. and Catherine street.
1 S. E. “ “ “ Sixteenth street.

1 At the Gas Works on Centre avenue.
1 N. E. corner of Carroll and Paulina streets.
1 Carroll street at the River for use of "Tugs."
1 N. E. corner of Carroll and Hoyne streets.
1 S. W. " Carpenter and Fulton streets.
1 S.W. " Centre av. and Evans street.
1 S. W. " Centre av. and Luke street.
1 North side of Cornelia bet. Reuben and Noble streets.
1 S. W. " Centre av. and Walsh street.
1 N. W. cor. Chicago av. and alley in rear of N.W. Round House.
1 At the Engine House on Chicago avenue.
1 N. E. corner of First and Wood streets.
1 N. E. corner of Fulton and Hoyne streets.
1 N. W " " First and Armour streets.
1 North side of Frank, bet. Blue Island ave. and Waller streets.
1 N. W. corner of First and Reuben streets.
1 N. W. " " " Bickerdike streets.
1 N. W. " " " Noble streets.
1 N. W. " Green and Tyler streets.
1 N. W. " " " Pratt streets.
1 S. W. " " " Fulton streets.
1 N. W. " Halsted and Twelfth streets.
1 N. E. " Harrison street and Centre avenue.
1 N. W. " Honore and Van Buren streets.
1 N. W. " Jackson and Seeley streets.
1 S. E. " " " Fourth avenue.
1 N. W. " Kansas and Loomis streets.
1 Lumber st., opp. Flint & Thompson's Grain Elevator.
1 N. W. corner of Leavitt and Fulton streets.
1 N. W. " " " " Kinzie streets.
1 N. W. " " Milwaukee avenue and Division street.
1 N. W. " " " " " Ridgeville road.
1 S. W. " " May and Walsh streets.
1 N. W. " " " " Evans street.
1 S. W. " " " " Luke streets.
1 N. W. " " " " English streets.
1 S. W. " " " " Hubbard streets.
1 S. W. " " " " Kinzie streets.

1 N. W. corner of Mitchell and Morgan streets.
1 N. W. " " " " Margaret streets.
1 North side of Mitchell, bet. Morgan and Waller streets.
1 S. W. corner of May and the line of First street produced.
1 N. E. " " Monroe and Leavitt streets.
1 S. E. " " Mather and Jefferson streets.
1 N. E. " " Nebraska and Laflin streets.
1 N. W. " " " " Loomis streets.
1 N. W. " " " " Throop streets.
1 N. W. " " Noble and Indiana streets.
1 N. W. " " Peck and Fulton streets.
1 opp. Peck street on Depot place.
1 N. W. corner of Polk and Sholto streets.
1 N. W. " Peck and Carroll streets.
1 N. W. " Paulina and Kinzie streets.
1 S. W. " Reuben and Tyler streets.
1 N. W. " " " Jackson streets.
1 S. W. " " " Van Buren streets.
1 N. W. " " " Bauwans streets.
1 N. W. " Sholto and Gurley streets.
1 N. E. " Sampson and Laflin streets.
1 N. E. " Sixteenth and Nutt streets.
1 N. E. " Taylor and Canal streets.
1 N. W. " Twenty-second and Loomis streets.
1 N. W. " " " Throop streets.
1 N. W. " Throop and Kansas streets.
1 N. W. " Union and Luke streets.
1 N. W. " " " Barber streets.
1 N. W. corner of Van Buren and Seeley streets.
1 N. W. " Warren and Oakley streets.
1 N. W. " Waller and Coolidge streets.
1 N. W. " " " Frank streets.
1 N. W. " Washington and Sheldon streets.
1 N. W. " " " Laflin streets, produced.

79 Total in the West Division.

NORTH DIVISION.

1 N. E. corner of Asylum place and Orchard street.
1 N. W. " Burling and Willow streets.
1 West side of Burling street, at North end of pipe.
1 S. W. corner of Clark street and McCagg place.
1 N. W. " Dayton and Willow streets.
1 N. W. " " " Clay streets.
1 N. E. " Florimund and Franklin streets.
1 N. W. " Howe street and Centre avenue.
1 West side of Howe, between Willow and Centre.
1 N. W. corner of Hurlbut and Blackhawk streets.
1 N. W. " " " Schiller streets.
1 N. E. " Linden and Church streets.
1 N. W. " Lincoln avenue and Sophia streets.
1 N. E. " Larrabee and Sophia streets.
1 N. W. " Maple and Clark streets.
1 N. E. corner of Ohio and Kingsbury streets.
1 N. W. " State " Huron "
1 North side of Whiting east of Wells street.
1 N. W. corner of Wells and Kinzie streets.

19 Total in the North Division.

In all, 151; making, together with those previously put in, 1,070 hydrants in the city to April 1st, 1869. 74 were taken out and renewed during the year.

Owing to the precautions taken and the unusual mildness of the winter, but 110 hydrants got frozen and had to be thawed out, and these, with a few exceptions, were in localities to which the sewerage does not yet extend.

STOP-COCKS.

The following stop-cocks were put in during the year, viz:

SOUTH DIVISION.

1	6	inch,	Archer avenue,	West	line of	Reuben street.
1	6	“	Calumet “	South	“	Twenty-second street.
1	4	“	Burnside street,	“	“	Thirty-first street.
1	4	“	Butterfield “	“	“	Thirty-first street.
1	4	“	Hickory “	West	“	Main street.
1	8	“	Twenty-ninth street,	East	line of	State street.
1	8	“	Thirty-first “	“	“	“ “
1	8	“	Thirty-second “	“	“	“ “
1	8	“	Twenty-sixth “	“	“	Clark “
1	8	“	State “	South	“	Thirty-first street.
1	6	“	Wallace “	“	“	McGregor street.
1	6	“	Wentworth avenue,	“	“	Twenty-fourth street.
1	6	“	Wabash “	“	“	Thirty-first street.

13 Total number in the South Division.

WEST DIVISION.

1	4	inch,	Burlington,	South	line of	Sixteenth street.
1	4	“	Baldwin,	North	“	Kinzie street.
1	4	“	Bauwans,	West	“	Reuben street.
1	6	“	Centre av.,	South	“	Sixteenth street.
1	6	“	“ “	“	“	Twenty-second street.
1	4	“	Carroll,	West	“	Reuben street.
1	8	“	Desplaines,	South	“	Polk street.
1	4	“	Ewing,	West	“	Halsted street.
1	6	“	Harrison,	“	“	Centre avenue.
1	6	“	Kinzie,	“	“	Lincoln street.

1	6 inch,	Louis, South line of Adams street.				
1	6 "	Milukee avenue, North line of Division street.				
1	6 "	"	"	South	"	Chicago avenue.
1	4 "	Ma		North	"	Kinzie street.
1	6 "	"		South	"	Chicago avenue.
1	8 "	Mgan,		"	"	Sixteenth street.
1	8 "			"	"	Twelfth street.
1	4 "	Nu,		"	"	Sixteenth street.
1	6 "	Nce,		North	"	Kinzie street.
1	6 "	Paina,		"	"	" "
1	8 "	Sienth,		West	"	Halsted street.
1	6 "	Twnty-second,		"	"	Centre avenue.
1	8 "	Uon,		South	"	Twelfth street.
1	8 "			"	"	Sixteenth street.
1	16 "			Opposite the High School.		
1	6 "	Vn Buren,		West line of Throop street.		
1	6 "	"		" " Centre avenue.		

27 Total nuber in the West Division.

NORTH DIVISION.

1 4 inch, Hs, West line of Wells street.
1 8 " LSalle, North line of North avenue.
1 8 " " " " Schiller street.
1 4 " Vndel, West " Wells street.

4 Total nuber in the North Division.

In all, 4 making, together with those previously put in, 501 stop-cocks the city to April 1st, 1869; 17 stop-cocks were renewed duing the year.

THE LAKE TUNNEL.

With two slight exceptions, this has continued to work with entire satisfaction. The first difficulty was owing to leaving the fish screens in the gate openings of the Lake Shaft too late in the season, when they became obstructed by anchor ice. They were taken out, when it was supposed no further difficulty would occur during the winter; but very early on Christmas morning the entire gateways were obstructed by anchor ice. Fortunately the tug employed by the Board was in readiness to leave, and after a little delay, caused by ice at the mouth of the river, the crib was reached, and the anchor ice removed; but before every thing could be restored to its usual condition the reservoirs were emptied and the whole city was out of water nearly three hours. As this occurred, however, after early breakfast, many people did not know the water was shut off at all, and happily there was no great inconvenience caused by it.

The outside of the crib, which had been considerably cut away by ice, was resheathed above and below the water line, and the angle irons at the south corner extended downwards two feet. Judging from examinations made by the diver, Mr. P. E. Falcon, it will be best to carry out soon the original design of erecting a permanent stone structure on the crib from as far below as may be possible. A plan of this structure has been prepared.

As promised in the last Annual Report, there will now be presented, with illustrations at the end, a

DESCRIPTION OF THE LAKE TUNNEL.

In order to show the necessity for this structure, which no one now doubts, but which was not so clearly seen when the subject of procuring a better supply was under discussion between the years 1860 and 1864, it will be proper to give a brief history of the

PREVIOUS MODES OF SUPPLY.

Although old maps show that the name of the present site of Chicago was called Chicagou more than a hundred years ago, yet the foundations of the city proper were not laid till 1833. From that date till 1840, when the population was about 4,500, no other supply than ordinary wells and cisterns existed, except what was carted from the lake. Then the old Hydraulic Works were erected by a private corporation. These consisted of an 18 inch inlet nearly 700 feet long from a crib in the lake to a well 15 feet deep, the inlet bending down nearly to the bottom; of pumping works on the lake shore, at the foot of Lake street; and of wooden supply pipes, of which latter, before the abandonment of the works, there were several miles, none of which exceeded 6 inches in diameter, and most of which were 2 and 3 inches. The greatest quantity ever supplied by these works is not accurately known. The engine and house have long since been removed, and the ground where the inlet was filled up. The Adams House occupies the site of the old works. The wooden pipes are frequently dug up in excavating for sewers and iron water pipes, and appear to be perfectly sound.

In 1851, when the population was about 35,000, a charter having been obtained by the city, the present works were commenced. Under the direction of the Board of Water Commissioners, the Pumping Works were located on the Lake shore on the north side of Chicago River. In recommending this site the Chief Engineer, Mr. Wm. J. McAlpine, said:

"It is very questionable whether the small quantity of water which is discharged from the river would affect the quality of the water in the lake at a point one and a half miles south.

"From the consideration which I have given to the subject, I am of the opinion that there is no perceptible difference between the quality of the water in the lake above the pier and at the place one and a half miles south of the river, on which the estimates have been predicated."

The works were put in operation February, 1854. They consisted of one reservoir, containing about half a million gallons, and 8¾ miles of iron pipe, besides the pumping works already described in Mr. Cregier's report. The population at this time was about 70,000.

ACTION OF WATER COMMISSIONERS RELATIVE TO BETTER SUPPLY.

The increased growth of the city after that time, and the introduction of sewerage, together with the establishment of packing houses, distilleries, &c., caused such a change in the quantity of filth flowing into the lake that complaints began to be made of impurity and offensiveness occasionally in the supply from the pumping works. In 1860, one of the Water Commissioners, Mr. Edward Hamilton, proposed to sink a wrought iron pipe, 5 feet in diameter, one mile out into the lake to obtain a supply beyond the effect of the river. This project was referred to the Chief Engineer of the Board of Sewerage Commissioners to examine and report upon, with the request "that he also take under consideration and report on the matter of erecting additional pumping works in such locality as shall secure a supply of pure water."

The report made in compliance with the foregoing request did not recommend the immediate adoption of any plan, but discussed various projects. Among others, that of a tunnel was suggested; but it was thought best to defer the whole subject until further examination and analysis could be made, in the hope that much of the complaint against the water supply might prove imaginary.

What, however, was at first apparent only to the most sensitive organizations, soon grew evident to all, and in the course of two or three years more, the water supply became occasionally very offensive both to the taste and smell. A remedy for this state of things could no longer be neglected.

ACTION OF BOARD OF PUBLIC WORKS RELATIVE TO BETTER SUPPLY.

The Board of Public Works, which was created in 1861, discussed the various projects that had been suggested, and made experiments with filtering, which, however, they soon saw would not answer. The engineer of the Board, after much doubt and careful examination of the whole subject, became more inclined to the tunnel plan than any other, as combining greater directness to the nearest inexhaustible supply of pure water, with permanency of structure and ease of maintenance. The possibility, and in the estimation of many, the great probability of meeting with insuperable difficulties, in the nature of the soil, or storms, or ice on the lake, was fully considered. One by one the objections appeared to be overcome, either by providing against them, or discovering that they had no real foundation. The plan, when so far worked out as to show how the tunnel might be constructed, was submitted to different engineers, among the number Col. J. D. Graham, U. S. Engineer, Mr. John B. Jervis, Captain Wm. H. Swift, and L. H. Clarke, chief engineer Illinois Central R. R., all of whom expressed their belief in the practicability of the scheme. Benj. Carpenter, Esq., first president of the Board of Public Works supported the plan warmly from the time it was explained to him; and the Hon. Wm. B. Ogden, though not a member of the Board, offered very early in the history of the project to advocate it publicly if it should be necessary. The other members of the first Board—Messrs. J. G. Gindele and F. Letz—though very cautious and somewhat doubtful at first, became satisfied with the general features of the plan. In the meanwhile, in consequence of legislative action, a new board was chosen, consisting of the two last-named gentlemen, Mr. O. J. Rose, and the Hon. F. C. Sherman, the mayor, who was *ex officio* a member. At the suggestion of Mr. Sherman, more thorough examinations of the soil, consisting of borings every 500 feet, were made. These fully confirmed what was previously inferred from the known character of the foundation underlying the north-eastern portion of the city and extending out under the lake. The whole Board were now prepared to recommend the project to the City Council.

ACTION OF THE CITY COUNCIL RELATIVE TO TUNNEL PLAN.

A committee was appointed by the latter body to consider the subject. This committee consisted of Messrs. C. L. Woodman, J. A. Hahn, and F. C. Brown, aldermen; F. C. Sherman, mayor; and S. S. Hayes, comptroller; some of whom were known to have strong doubts with regard to the propriety of undertaking such a work; but the result of their investigations was a unanimous report in its favor. The City Council then passed the necessary ordinances, and the Board advertised the work for letting.

PREPARATIONS FOR LETTING THE WORK.

The opening of the proposals was looked to with great interest, as it was feared that no responsible parties would offer to take the work for less than millions instead of only about three hundred thousand dollars, the engineer's estimate; in which not only the public generally but the Board of Public Works themselves had no great confidence. The result was both surprising and gratifying to the Board. Seven bids were received, ranging in amount from $239,548 to $1,056,000. Owing to failure to appear with sureties at the proper time, and to objectionable conditions, the two lowest bids were rejected.

On the 20th of October, 1863, after considerable inquiry relative to the ability and qualifications of the parties, and a visit of the city's legal adviser, Benj. F. Ayer, Esq., to Harrisburgh, Pa., to ascertain the standing and pecuniary responsibility of the sureties offered, a contract was entered into for the execution of the work with Messrs. J. J. Dull and James Gowen, of Pennsylvania. To this proceeding the City Council had given their authority by an ordinance dated the 5th of the same month.

OPPOSITION.

About this time the public press, which had previously almost unanimously spoken favorably of the project, turned almost as unanimously against it. This opposition gradually diminished but did not cease entirely till the work was nearly completed.

An injunction against the construction of the work, as likely not only to end in failure, but to involve the city in a useless debt of millions, was seriously talked of, though not publicly discussed.

On the evening before the date of the contract, an ordinance was submitted to the City Council, to repeal the authority previously given to the Board of Public Works to enter into contract for the tunnel. The preamble to this ordinance set forth that the construction of the proposed crib would be a permanent obstruction to navigation.

The Board of Public Works, to whom this subject was referred, stated in their answer that "The opinion of Mr. Ayer, "submitted herewith, shows that the city has clearly the right to "build the piers; that Congress, by its paramount authority, "may declare the same unlawful structures, and authorize the "courts to remove them; but that all previous court decisions "establish that, before being ordered removed, the piers must "first be shown to be serious obstructions to the lake navigation.

"The piers with their beacon lights will, we think, be helps "and not hindrances to navigation,—helps to show the sailor his "position while in safe waters.

"The Board have, however, already taken steps to procure "the sanction of Congress to the erection of the piers; but, if it "comes to the worst,—that is, if the structures are declared "unlawful, and the piers are proved to be serious obstructions to "lake navigation, and the courts order the city to remove them,— "the Board will remove them to such a depth below the surface "of the lake that they cannot endanger navigation, as has been "contemplated from the first, and as may be done at any rate."

The repealing ordinance was not passed.

OUTLINE OF THE PLAN.

The plan of the work, as thus determined upon, consisted of a land shaft at the western and a lake shaft at the eastern extremity, to be permanent, and three intermediate lake shafts for expediting the construction, to be removed on the completion of the work. The tunnel proper to be two miles in length, beginning on the lake shore near the pumping works; and extending outward in an east north-easterly direction. The shafts to be protected by cribs, or hollow pentagonal breakwaters, from storms, vessels, and ice.

The horizontal diameter of the tunnel was fixed at five feet, and the vertical two inches greater, for convenience in drawing the centres during construction. This size was determined upon for two reasons: *First*, it was sufficient to deliver a supply for one million of inhabitants at the rate of fifty gallons a day for each person, the average quantity used at that time. *Second*, experience in Europe had shown, that while it was possible to make small tunnels in the most troublesome ground, the attempts to make large ones had sometimes failed, and at others had been attended with enormous difficulties. This was particularly the case in works of the kind described by Minard in his *Cours de Construction*, pp. 284, 285, and in the earlier as well as later efforts to construct a tunnel under the Thames.

Although there was every reason to expect easy work here, there was a possibility of meeting with deposits of quicksand or other soft and wet material. In order to remove, as far as practicable, every doubt of the final success of the work, this small size was adopted, in the full conviction that whenever it should prove insufficient to supply the demand upon it, the population and wealth of the city would be abundantly able to construct another, and, if necessary, a larger one.

CONSTRUCTION OF THE WORK.

The work was commenced at the land shaft on the 17th of March, 1864, the delay since the date of the contract having been caused by waiting for the cast iron cylinders, which had been ordered by the Board, for the first thirty feet, instead of the brick shaft as originally intended.

These cylinders are 9 feet internal diameter, 1½ inches thick, and in three sections, each 10 feet long. The bottom of the lowest section has a cutting edge. The sections were united by internal flanges, bolts and rust joints. The top flange of the cylinder was fitted to receive an air lock, in case that should have proved necessary in the prosecution of the work.

It was intended originally to make the lining of the land shaft of brick clear to the top, but the Board feared trouble from the quicksand which extended down about 14 feet from the surface, and particularly as the inlet through which the city was supplied was not only in this quicksand, but very near the shaft. Owing to the want of suitable pumps, there was unexpected delay in sinking the cylinders, but as soon as the clay had been penetrated a few feet, all serious difficulty ended, and the remainder of the shaft was sunk to its proper depth through clay of various degrees of tenacity, from very soft near the top to indurated near the bottom. Before reaching the bottom the contractors requested the Board to allow them to go deeper than the plan called for, in order to have a thicker roof under the bed of the lake; but on meeting with water and gas, they concluded that a greater depth would only bring them into greater difficulties, and were content to carry out the original design. The shaft was walled up 8 feet in diameter, with masonry 12 inches thick, to the bottom of the cast iron, the inside of which was laid with masonry to the top of the lowest section. At the bottom of the shaft there was a sump 6 feet deep below the bottom of the tunnel. This had to be emptied generally twice a day during the whole progress of the work, as the quantity of water discharged from a spring there continued very uniform.

From the bottom of the shaft a drift, at first only intended to be temporary, was made about 50 feet long, westward, with a chamber at the end with fixtures for mounting a transit. The regular tunnel work eastward was commenced May 26th, 1864.

Here much pains was taken to introduce a curved surface in the masonry between the shaft and upper side of the tunnel, and it was satisfactorily accomplished. The entrance to the tunnel was made 6 feet in diameter, and tapered down to 5 feet in a distance of twenty feet. The masonry on this portion was made of three shells of brick work, each four inches thick, with cement joints half an inch thick between. The rest of the tunnel proper was lined with two shells of brick work. It was intended at first to fill the cavities around the outside of the brick work with well tamped earth, but it was soon found impossible to get this done in a satisfactory manner. For this reason, solid masonry was almost immediately substituted for the tamped earth. The upper arch was built on a ribbed centre of boiler iron, which diminished the open space inside of the tunnel only 4¼ inches, and thus allowed the cars, which conveyed away the earth, to go up to the face of the excavation, usually kept from ten to twenty feet ahead of the masonry. The iron centre was thirty inches long in the direction of the tunnel. About two feet in length of masonry was usually laid at a time, and as a rule it was found safe to strike the centre within fifteen minutes after the arch was keyed. At first it was supposed necessary to excavate nearly a foot above the top of the brick work, in order to give the masons room to build the upper arch; but very soon it was found that they could build it perfectly well, generally, without making the excavation any larger than the space required for the brick work. This was done by driving the last four or five top courses of brick into well tempered cement mortar first thrown into the cavity. The driving of the bricks effectually filled up the spaces which could not otherwise have been reached by hand. The ends of the masonry were left "toothing" and thus furnished a guide in driving the bricks on the upper arch. The lower arch was built by templets or patterns, as ordinary sewers are, and usually kept some six feet in advance of the upper arch, to allow of greater convenience in loading the cars with earth, which the miners had to keep at some distance behind them, and which the shovelers could not throw into the cars very well, when they stood under the brick work.

The excavation was, generally, through stiff blue clay, but with the irregularities of character peculiar to the drift. It very seldom required bracing when not left to support itself more than thirty-six hours. Sometimes sand pockets were met, and when those were over the upper arch, they would empty themselves partly, leaving cavities to be filled with masonry, but these were seldom of much importance. Sometimes small bodies of quick-sand were encountered, but they occurred only in pockets and not in strata, and therefore gave no serious trouble. Sometimes the clay would be soft enough for a miner to run his arm into it, but, with the exception of requiring a little more "trimming" for the masonry, this gave no trouble. Sometimes boulders, weighing several hundred pounds, were met, and interfered a little with the regular progress of the work, but seldom more than a little.

The greatest and most dangerous difficulty met with was one that was not anticipated at first, and that was inflammable and explosive gas. Early in the progress of the work several accidents occurred from this cause, but fortunately without fatal results to the workmen, though there were several narrow escapes.

Very soon the miners learned to detect the proximity of cavities containing this gas from the sound produced by striking over them with their picks. When a cavity was thus detected, it was bored into with a small auger, and the gas ignited as soon as it began to escape. In this way explosions were prevented, which otherwise took place when large bodies of gas were suddenly allowed to mix with the air. The explosions that did occur were slight in character, but left a body of flame in the upper part of the tunnel. At such times the miners fell with their faces to the ground, and thus escaped without any greater injury than singed beards and eyelashes, and blistered faces, except in the first severe case when a miner was badly burnt. At this time the gas kept the miners out of the tunnel three days.

CHAMBERS.

With trifling exceptions, this work was prosecuted day and night by means of two sets of miners and one of masons, working eight hours each in every twenty-four, for six days in the week, till the 16th of October, when a point about 750 feet from the center of shaft was reached. Here it was determined to make two temporary chambers, one on each side of the tunnel, with which they were to be connected by small and short openings. It took about one week to construct these chambers and connections, all of which were supported by timbers and planks. In the tunnel and at the connection between the chambers a turn-table was placed. This arrangement permitted not only the passage of cars by each other, but also the making up of trains, which soon became an absolute necessity for the economical and rapid execution of the work. By means of such chambers, it was practicable to carry on the work a mile or more out under the lake as fast as could be done near the bottom of the land shaft; in fact, the progress upwards of a mile out was really greater than it was near the shore, owing to the greater skill and experience acquired on the way. A gap of about six feet in the masonry of the tunnel was left at the connection between these, the first chambers, to be built in after the completion of the rest of the work. After two or three weeks, several cracks, entirely around the tunnel, were discovered in the brick work within a distance of about 12 feet, on each side of the turn-table. There were various conjectures as to the cause of these cracks, for up to this time repeated careful observations had shewn no indications whatever of any movement in the masonry after the keying of the upper arch. Occasionally, in soft ground, the sides of the lower arch had been pressed in an inch or two before the upper arch was built, but no transverse crack was ever discovered except those near the chambers. The conclusion was that they were probably caused by the yielding of the earth in the pit of the turn-table; yet, no settlement in the masonry was observed.

The second set of chambers was made one thousand feet beyond the first, and the character of the work, as well as the mode of carrying it on, continued the same, except that the use of mules was substituted for men in the transportation of earth and materials for the masonry. Stout abutments were built on each side of this turn-table to prevent the cracking of the brick work, observed on each side of the first, but just the same number and character of cracks occurred, notwithstanding. It then became evident that these cracks were owing to a tendency in the clay to move, or "creep," as it is sometimes expressed, towards any cavity made in it. The gap left at the connection between the chambers being only temporarily supported with wood, could not wholly prevent this creeping movement. It was, therefore, determined afterwards to continue the brick work over and around the next turn-table, and to brick around the connections between the chambers, groining carefully their intersections with the tunnel. After this method of constructing the chamber connections was carried out, all trouble from cracks ceased. In this manner, placing the sets of chambers about a thousand feet apart, the work was continued to about a mile and a half from the land shaft.

The character of the work continued throughout very much the same. The greatest progress made during any one week was 93 feet. Only once was a boulder so large as to require blasting met with. There was a little nervousness as to the effect of a blast under the lake, but it caused no serious disturbance either of the ground or the masonry.

VENTILATION.

The ventilation of the tunnel was effected by means of tin pipes, through which the foul air was drawn out and fresh air consequently drawn in through the main opening. At first a six inch pipe was used, and this was connected with the furnace of the hoisting engine. Later it became necessary to provide an engine and fan expressly for the purpose and to put in larger pipes. Eight inch ones were introduced. It was difficult to keep the joints of the pipes, which were only of ordinary tin, very tight, especially near the chambers, where the mules struck them with their heads in turning. Still, they answered a very good purpose, and the air, a mile and a half out, was about as good as it was much nearer to the land shaft. Ordinarily there was so much smoke from the miners' lamps and vapor from the heat of the workmen as to make it impossible to see distinctly enough to run the lines and levels required to keep the tunnel in the right direction. On Sunday nights, however, and on other holidays, the air became so clear as to cause sperm candles to burn with a beautiful silver brightness, visible sometimes two thousand feet.

ALIGNMENT.

To determine the position of the lake shaft and the line of the tunnel, much pains was taken to establish an accurate base on the shore for purposes of triangulation. Owing to the buildings in the way, this was no easy task. For the alignment of the tunnel an astronomical transit of four inch aperture, by Pike of New York, was mounted on a tower built for the purpose, 166 feet westward of the land shaft, and sometimes used in the chamber below already described. To aid in placing the lake shaft beyond all doubt in the line of the tunnel, a 6 inch tube was sunk 280 feet eastward of the land shaft, after the masonry had been carried beyond that point. By plumbing up through this tube, a "range" of great accuracy for such a purpose was obtained. The astronomical transit could only be used on the tower above or in the chamber below. As soon as the work had been carried so far that the sperm candles used in the alignment could not be seen at "the face" of the work, the centre line was produced from point to point by means of a goniometer with two telescopes, which, when in perfect adjustment, could be made to "reverse" on the same point, which was thus proved to be in a straight line with the instrument and the "back sight." All of these operations, as well as those necessary for lines and levels at the crib afterwards, were under the immediate direction of Mr. Wm. H. Clarke, the principal Assistant City Engineer, who continued personally to attend to them until other duties and impaired health made it necessary for him to keep out of the tunnel. The final and very satisfactory result with regard to lines and levels, mentioned hereafter, prove the great care and accuracy with which Mr. Clarke conducted his operations.

INSPECTORS AND DOINGS OF THE DIFFERENT SHIFTS.

It was deemed a matter of great importance on the part of the Board of Public Works to have a representative constantly in the tunnel, not only to see that the work was done properly, but to take prompt measures for its safety in case of accident or threatened danger. At first, Messrs. Herman Kroeschell, Edward Everett and George Dewer were employed.

Mr. Kroeschell, an educated and experienced mining engineer, was principal inspector of mining, and directed the "trimming" shift, which worked the eight hours immediately before the masons commenced. He set the "patterns" by which the masonry was built, producing for this purpose the lines and levels given by the engineer in charge, by means of plummets, ranges with sperm candles, and spirit levels. His shift consisted usually of four miners and four other men, who at first pushed the loaded cars to and from the shaft, but afterwards to and from the nearest chambers, from which they were hauled by mules to the shaft and back again, either empty or loaded with brick, cement or sand. Only two of the miners usually were regularly trained men, the others being but picked laborers, who soon learned to use mining tools in the clay. The general custom was for two miners to work together for ten or fifteen minutes at a time with more than common vigor, and then rest. The pushers loaded the excavated earth into the cars, brought as near the face as possible on a movable truck. This shift, besides frequently carrying the face of the excavation five feet ahead, did all the trimming necessary to form the interior of the excavation as nearly as possible to the exact outside shape of the masonry.

The next, or mason's shift, was under the constant inspection of Mr. Everett, employed for years previously in this city as a very efficient inspector of sewers. This shift usually consisted of three masons, one mortar mixer, and four to six helpers, according to the distance between the chamber and the work. The water for mixing the cement mortar was all brought from the top of the land shaft in tank cars, made especially for the purpose. The principal cement used was that known here as "Clark's LaSalle," but there was also a considerable quantity of the Falls City Louisville, and some of the Akron, N. Y. The cement and sand were mixed together in equal quantities. It will be a matter of much interest when the tunnel is again entered for examination, to ascertain the relative degrees of hardness and probable durability of the different kinds of cement used. The average length of masonry laid by this shift was 12 feet a day, for the entire distance, but for the first 2,000 feet the greatest progress scarcely equalled this rate. Afterwards it sometimes reached 15½ feet a day; but this latter rate could only be attained by putting on a couple of miners during this shift. The earth they excavated could not be removed from the tunnel while the masons were in, and consequently delayed to some extent the operations of the next or principal mining shift; but this course enabled the contractors to advance the whole work two feet more a day than they could have done without it.

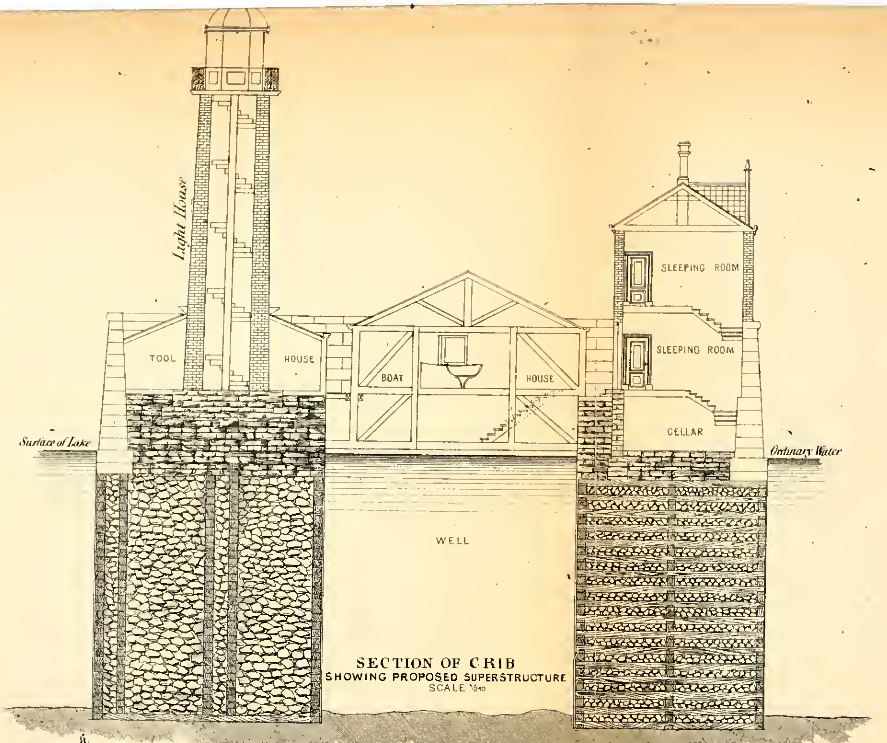
The principal mining shift was under the inspection of Mr. Dewer, an experienced miner. His chief duties were to keep the excavation within the proper lines and to watch carefully for the approach of bad ground, so as to be ready with bracing, or to take any other course the emergency might require. Mr. Dewer's health failed during the progress of the work, and he was succeeded by Mr. Edward Offermann, who continued till the tunnel was completed. This shift consisted of four miners and four pushers.

OPERATIONS ABOVE GROUND.

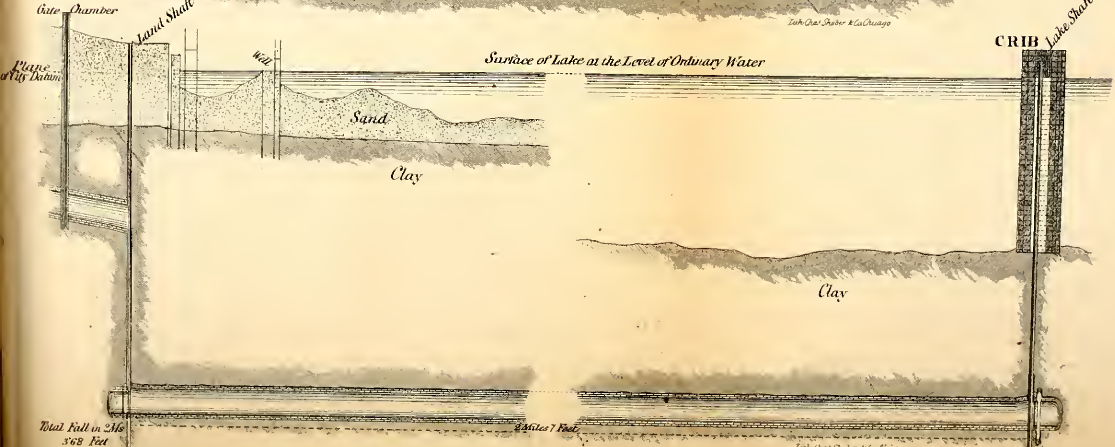
The operations above ground were under the immediate direction of Mr. John P. Offermann, the contractor's superintendent. There were two shifts of mechanics and laborers employed here each during twelve hours of the day. The whole force above consisted, generally, of one superintendent, one night foreman, two engine tenders, four topmen, one day laborer and one carpenter. Two mules were constantly employed, and one kept in reserve in case either of the others should fail. All the bricks were carefully inspected above ground, by Michael Whelan, an employe of the Board.

PLAN AND CONSTRUCTION OF THE CRIB.

Preparations for commencing operations at the outer end of the tunnel were early made, but owing to disappointments of the contractors in getting the necessary timber for the crib, and other delays, the foundations of the outer, and only one it was found necessary to build, were not laid till May, 1864. This was done on the north side of the river about 800 feet west of the Light House. The dimensions of the crib as required by the specifications, are 58 feet horizontal measurement on each of the five sides, and 40 feet high. The inner portion, or well, has sides parallel with the outer ones, and 22 feet long each, leaving the distance between the inner and outer faces of the crib, or thickness of the breakwater, 25 feet. This breakwater was built on a flooring of 12 inch white pine timber laid close together. The outer and inner vertical faces and the middle wall between them were all of solid 12 inch white pine timber, except the upper 10 feet of the outside, which was of white oak, to withstand better the action of ice. Across the angles of the outer and middle walls were placed brace walls about 10 feet long, of solid 12 inch timber. The middle wall on each side of the crib was continued straight through to the outside wall. Connecting the outer and inner walls, and passing through the middle wall, were cross-ties of 12 inch timber, placed horizontally about 9 feet, and vertically one foot apart. The ends of all the timbers, where they passed through the outer and inner walls, were dovetailed,



SECTION OF CRIB
SHOWING PROPOSED SUPERSTRUCTURE
SCALE 1/240


Gate Chamber
Land Shaft
Plane of City Datum
Well
Surface of Lake at the Level of Ordinary Water
CRIB
Lake Shaft
Sand
Clay
Clay
Total Fall in 2 Ms 3·68 Feet
2 Miles 7 Feet
Lith Chas Shober & Co Chicago

LONGITUDINAL SECTION OF TUNNEL &c
HORIZONTAL SCALE 1/5600 VERTICAL SCALE 1/360

and notched half and half into the timbers of the middle wall. All of the timbers used were carefully inspected and well jointed, which was mostly done by hewing, though nearly all of it was first sawed. It was found impossible, however, to get sawed timber of perfectly uniform dimensions. The floor timbers were laid on ground timbers placed directly under the outer, middle and inner walls of the crib. Round 1½ inch bolts, 36 inches long, with large washers at the bottom, were placed vertically, 4 feet apart, to hold the ground and floor timbers firmly to the first two courses of wall timbers above the flooring. All of the wall timbers were fastened to each other by 1¼ inch square bolts 34 inches long, pointed and driven somewhat slanting into 1¼ inch auger holes, about 5 feet apart. The slant was given in opposite directions to the bolts nearest each other, to avoid the possibility of their being drawn out by the buoyancy of the timber, an accident which once occurred to a somewhat similar structure in the west.

Three rectangular openings, each 4 feet wide and 5 feet high, were made through the breakwater at different depths below the surface of the lake, so that water could be drawn from near the bottom, middle or top, as future experience might show to be best. These openings, and wells 4 feet square from them to the top of the breakwater, were timbered around in the same careful manner as the rest of the crib. Each well was provided on its inner face with slides for a temporary gate to cut off the water whenever thought necessary.

The floor and walls of the crib were all carefully calked. The interior of the breakwater was divided into seven water-tight compartments, made so by the calking already mentioned, and "matched sheathing" between the walls. The object of these water-tight compartments was to make it easy to build solid masonry in the whole of the breakwater at any time within the course of a few years, if it should be thought best. The whole of the outside surfaces of the outer and inner walls were sheeted with two inch pine plank carefully jointed, placed vertically and spiked on. Instead of pine, three inch white oak was used for the upper portion of the outside, to resist the ice. The upper 10 feet of each outside corner was protected by angle-irons, extending each way two feet, and one inch thick, and firmly fastened by 2 inch round bolts. From the bottom to the top of the crib, and into which the ends of the angle-irons were let, there were ten pieces of white oak, 5×14 inches, fastened every two feet to the middle wall with 2 inch round bolts. Similar pieces 3×12 inches, 39 feet long, reaching from the top of the crib to the flooring, were fastened by the same bolts to the inside of the middle wall. It will thus be seen that apparently excessive care was taken to make the crib strong; but subsequent experience showed that this care was none too great.

LAUNCH.

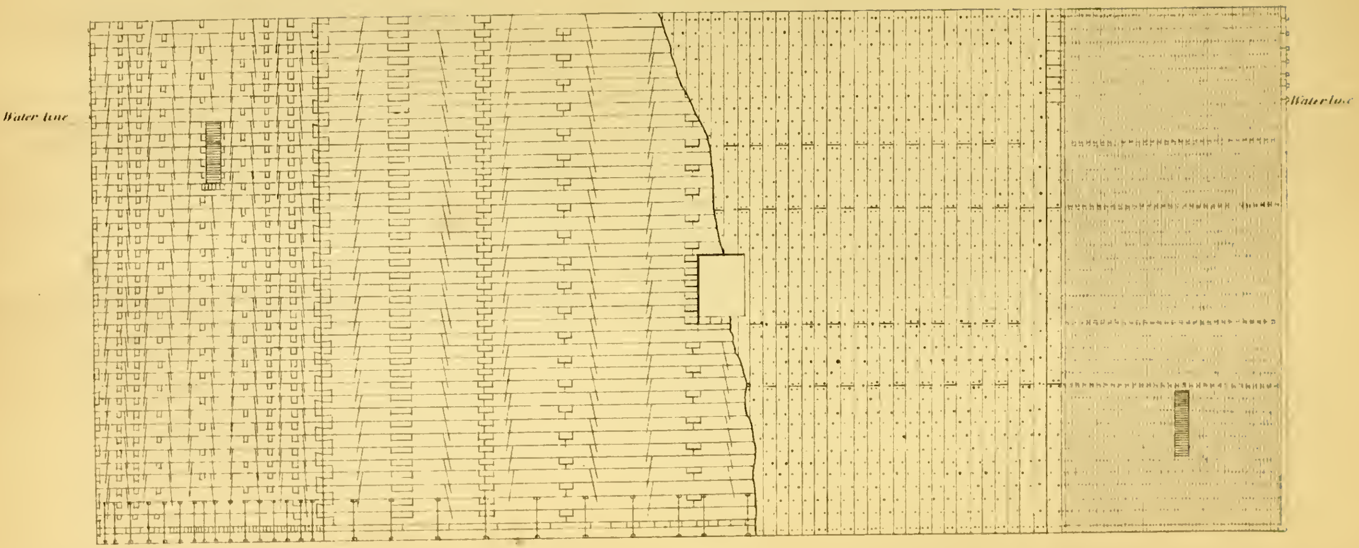
The crib, when built, was in a horizontal position. In order to launch it, it was raised by screws and inclined at an angle of 1 in 12 towards the water. Seven ways were placed under it and extended out 64 feet into the river on trestle work. The river portion of the ways gave a great deal of trouble on account of the uneven and stony character of the bottom, and accidents caused by passing vessels. Everything being ready, the launch took place on the 24th day of July, 1865, when the crib glided without accident or delay gracefully into the water, in the presence of a large number of spectators.

SUPERINTENDENCE.

The contractors employed as their foreman, in the construction and launching of the crib, Mr. Geo. R. Bramhall, a mechanic of unusual skill and judgment. The Inspector placed over the work by the Board was Capt. A. S. Bergh, who had previously had the immediate charge of the lake borings made before the work was let.

PLACING AND FILLING OF CRIB.

Immediately after the launch, the contractors towed the crib out to its position in the lake. As soon as the bar was passed, three small gates near the bottom of the crib were opened, and the draft of water, which at first was but a little over 8 feet, increased soon after reaching the anchoring ground to 21 feet. A mooring screw, opposite the intended position of each angle of



ELEVATION OF CRIB

SHOWING METHOD OF BOLTING AND SHEATHING SCALE $\frac{1}{180}$

the crib, had been placed under the direction of Mr. Clarke. To each mooring screw a 1½ inch chain cable was attached, and the loose end of the chain fastened to a buoy. Unfortunately, lake propellers had destroyed three of these buoys, and it was thought most expedient to substitute for the sunken chains ordinary anchors and hemp cables. As soon as the crib was brought near its position, the work of filling with loose rubble was commenced. Very soon the crib got " out of trim," and one corner of it rested on one of the low bars, peculiar to the lake at this distance from the shore. After some time had been lost in vain efforts to get the crib righted and into its exact position, the Board became alarmed for its safety, in case a severe storm should arise, and directed that no expense be spared that might seem necessary to the engineer to secure it with the utmost despatch. A wrecking pump was at once employed. By means of this, sufficient water was pumped into or out of the crib, as occasion required, to right it. The partitions between the compartments failed, and it was a matter of rejoicing that they did, for otherwise the removal of the wrecking pump from one compartment to another could not have been made in time. Three powerful tugs were hired, which, by the aid of sufficient tackle, finally towed the crib to its exact position.

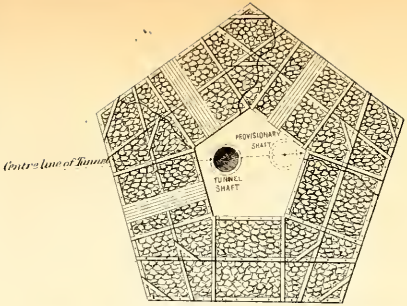
STORM AND ITS EFFECTS.

Immediately the contractors resumed the operation of filling the crib with stone, but very soon after a violent storm set in and drove the vessels loaded with stone into the harbor. This storm continued for three days, and threatened, before it abated, to do serious, if not fatal, injury to the crib. In order to hold it in its position as firmly as possible, the wrecking pump was kept at work to fill it with water, the stone thrown in previously not being sufficient to hold it down. During the height of the storm, every wave caused a perceptible rocking of the crib. The angle-joints of the inner and middle walls began to separate, and for a time caused intense anxiety. When the storm was over two of the inner angle-joints had parted an inch on top, and the entire crib had worked, against wind and waves, thirteen feet, and the north-west angle was 3¼ feet lower than the south-east. The great difficulty there would have been in restoring the crib to its exact position, and the fear there might be another storm in the meantime, prevented any attempt of the kind from being made. The very slight deflection this rendered necessary in the line of the tunnel was of no practical importance whatever, though regretted, and the variation of the sides of the crib from perpendicular, though a constant eye-sore, did not affect its stability. The filling of the crib with stones was proceeded with as fast as the contractors could, and since it was completed, about the middle of August, no variation whatever in the position of this structure has ever been perceived. A slight tremor is sometimes felt during severe storms and when large fields of ice are passing. The rubbing of field ice against the crib is occasionally accompanied with a fearful noise. At such times the crib appears to a spectator on it, to be an immense plough moving through the ice. On several occasions the broken masses lodged on the south side of the crib, forming banks several hundred feet long, and reaching from the bottom of the lake to ten or fifteen feet above the surface.

The breakwater portion of the crib being filled with stone, the contractors erected over it a temporary wooden covering, with a light house on top, and rooms above and below for the accommodation of their own men as well as the inspectors employed by the Board. It may be said in passing, that the air was so pure at this dwelling-place as to cause complaints, at first, from the cook, of the voracious appetites of the men. The reputation of the crib for healthfulness is still maintained, the present keeper being now quite vigorous and hearty although apparently a feeble consumptive when he went there to live about eighteen months ago.

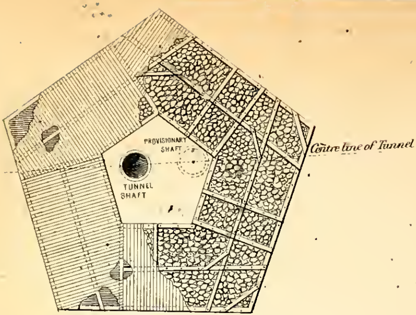
CYLINDER AND LAKE SHAFT.

The cast iron cylinder for the lake shaft was made in Pittsburgh, by Messrs. James Marshall & Co., who also made the one for the land shaft. It consists of seven sections, each nine feet in length, nine feet internal diameter, 2¼ inches thick, and in all other respects like the one for the land shaft, except that the

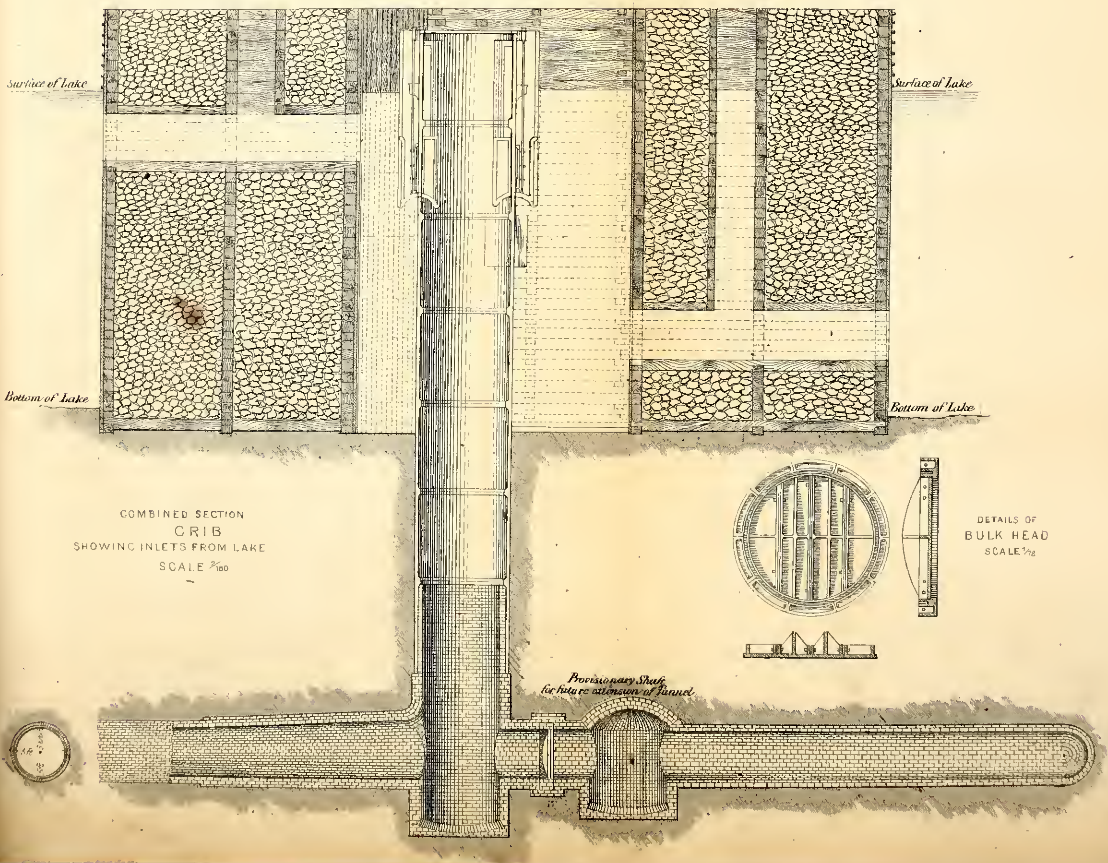


COMBINED PLAN SHOWING INLETS FROM LAKE

SCALE 1/540



PLAN OF CRIB FOR INLET TO LAKE TUNNEL



COMBINED SECTION
CRIB
SHOWING INLETS FROM LAKE
SCALE 2/180

DETAILS OF
BULK HEAD
SCALE 1/72

lowest section was turned on the outside to make it penetrate the clay more easily, and the upper end was provided with two gateways for the introduction or exclusion of the lake water. The gate-ways are each 54 inches high by 32 inches wide, and placed with their tops below the lowest known level of the lake. Each gate-way was provided with a sliding gate on the outside of the cylinder, raised by a screw worked at the top of the cylinder. Provisional arrangements were made at each gate opening for forming chambers on each side, in case it should ever be necessary to repair either gate, by simply sliding in temporary gates. The sliding faces for those temporary gates, as well as of the permanent ones, were made of "composition." Inclined ways were placed inside of the crib, during its construction, to aid in lowering the cylinder to its place, but the storm already mentioned destroyed them. The lowest and next cylinder sections were put together on an incline. They were held in place when required by chains on the outside secured to the lower end of the bottom section, and a brake over the upper side of the cylinder. They were lowered gradually on the incline by means of screws attached to the upper flange. These screws had to be removed, of course, for every new section put on. Care was taken to have sections enough together, before removing the chains from the bottom of the cylinder, to reach above the water. This required five, or 45 feet altogether, to be sure. A false bottom of wood was put into the cylinder at its lowest section, to keep out as much water as practicable. This gave the cylinder great buoyancy when sunk to a depth of 30 feet, and made it very easy to handle with blocks and falls placed over-head. On being lowered the cylinder sunk by its own weight two or three feet into the clay when the false bottom stopped it. A hole was then bored through the false bottom and the cylinder went down several feet further by its own weight. After the sixth or gate section was put on and the false bottom removed and excavation made within, the cylinder continued to sink by its own weight. After the top section was put on, a moderate force only was necessary to push the cylinder down 23 feet below the bottom of the lake. Below this point the work of sinking the shaft was substantially a repetition of that at the shore end of the tunnel, except that no water was met with, and no pump ever put in or required. The little leakage that occurred was easily removed in buckets.

An extension eastward, about 50 feet, was made, in anticipation of the possible extension of the tunnel at some future day still further out into the lake. This was provided with the necessary sump and bottom on which to place another iron cylinder. The extension was of great service during the construction of the work as a turn out for the cars, and afforded, by means of a 6 inch tube, sunk perpendicular from above the surface of the lake to its outer end, an excellent opportunity to start the line of the tunnel below with great accuracy towards the deflecting point in the middle.

INSPECTORS.

As the contractors did not deem it important to employ Mr. Bramhall after the lake shaft was sunk, the Board, highly appreciating his skill and industry, engaged him to perform similar duties to those of Mr. Kroeschell, in tunnelling from this shaft. Four different inspectors of masonry were employed, but neither of them stayed long. One of them, Thomas McMahon, while employed afterwards in the extension of the land shaft, had his ankle broken, which was the only serious accident that occurred to any one whilst employed on the work. It was not considered necessary to have a special inspector for the regular mining shift, this being generally left to Mr. James Brown, the contractors' foreman.

TUNNELLING FROM LAKE SHAFT.

The work of tunnelling was carried on from this end in very much the same manner, and about as rapidly as it was on the first 2,000 feet from the land shaft. The average progress made was 9⅓ feet a day till a point 2,290 feet from the lake shaft was reached, when operations in this direction ceased. When the work from the land shaft was within 100 feet of the same point, it was thought best to stop the masonry there and run a small timbered drift through to the east face to be certain as to how the lines were going to meet. The two faces were brought together on the 30th of November, 1866, when it was found that the masonry at the east face was only about 7½ inches out of the line from the west end. The horizontal measurements were only three inches longer than was estimated by triangulation. This result, considering the great difficulty of getting a clear atmosphere in the tunnel, was deemed very good, and much better than was generally expected. The last of the masonry in the regular tunnel, when the two faces were brought together, was completed on the 6th of December, and a stone commemorative of the event placed there by the Mayor of the City in the presence of the City Council and Board of Public Works, both of which bodies, together with a number of citizens, passed from the shore through the tunnel to the crib, and then by a tug to the city on that day.

The ventilation of the east end of the tunnel was effected by means of six inch tin pipes connecting with the furnace of the hoisting engine. The pipes extended to the end of the masonry. Occasionally, ashes from the furnace would stop the ventilation, which would soon be discovered at the face.

GATE CHAMBER, CONNECTIONS AND COMPLETION.

In December the work of filling up the chambers was commenced, and also that of connecting the tunnel with the pumping wells. Much had been done previously towards constructing a gate chamber between the land shaft and the pumping wells. This was made 19⅓ feet exterior, and 16 feet interior diameter, and divided into five compartments, separated by walls 20 inches thick. The outer walls were first built on a boiler iron shoe or curb, and then sunk by excavating within. An old abandoned inlet gave a great deal of trouble by letting in water; and the boiler iron shoe, which was adopted for the sake of economy, proved more expensive in the end than a cast-iron one would have been. The foundations were on a bed of concrete, 24 inches thick, on which the footings of the exterior and division walls, all of brick, were built. Through the bottom of each division wall, there were left rectangular gate openings, 3 feet wide and 5 feet high. The tops of these openings are 23½ feet below low water in the lake. In each opening a cast iron gate frame was built. The gates themselves are tapering. The frames were fitted with wedging grooves or ways projecting beyond the walls, just sufficient to free the gates when raised or lowered. It was hoped that the wedging grooves would allow the gates to be screwed down perfectly tight; but in practice they have given more trouble than was anticipated, and it is believed now that in making future structures of the kind for the city, if any should be required, it would be safer and better to put a gate on each side of the wall, so that the pressure of the water could always be used to keep the gate tight. The gates are operated by means of rods, stayed at intervals, and by screws with hand-wheels at the top of the walls.

The connection between the land shaft and the gate chamber was of precisely the same size and form as the main tunnel. The connections with the old and new pumping wells, and a partial one with the provisional or south pumping well, as also about 180 feet of a provisional connection with the lake shore, are all 4½ feet interior diameter, and were tunneled through soft clay, without any difficulty, except a little trouble in working under and through the piling beneath the old pumping well. The connection with the lake shore, or rather the old inlet basin, is to be used in case it should ever be necessary to suspend the supply through the main tunnel, either to examine, cleanse or repair it.

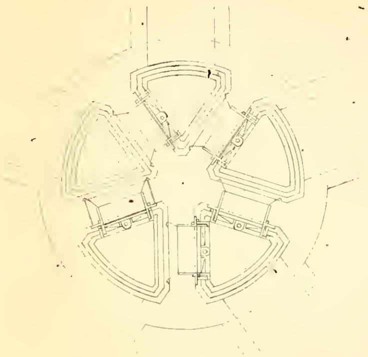
A temporary connection between the land shaft and the mouth of the old inlet was made by means of a timbered drift through the clay, and a brick well 4 feet interior diameter and 30 feet deep, provided with a curb built above the water on an iron shoe, held together by iron rods, and sunk by means of the same dredging apparatus that was used for sinking the curb of the new pumping well. Two wooden gates were left in the top of the curb, just below the surface of the water. A small area, enclosing the well and the inlet, were coffer-dammed around as far as necessary to cut them off from the flow of the lake whenever desired.

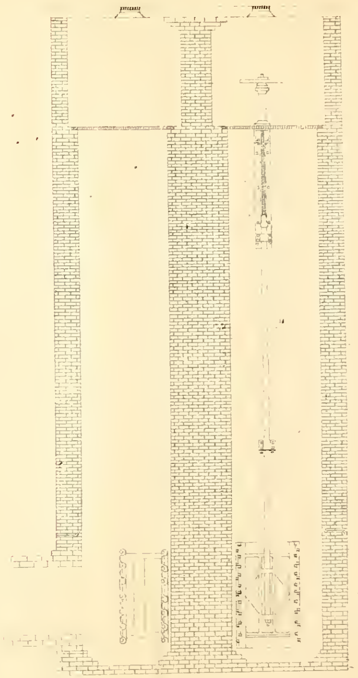
The work of filling the chambers of the main tunnel, and the cleansing of that structure having been completed, water was

PLAN OF GATE CHAMBER.

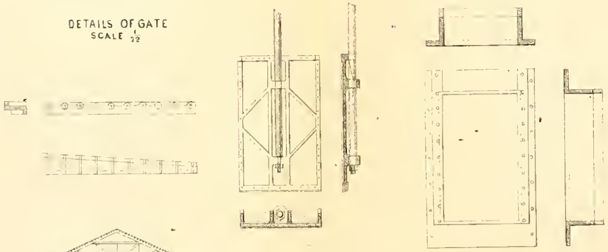
SCALE $\frac{1}{120}$

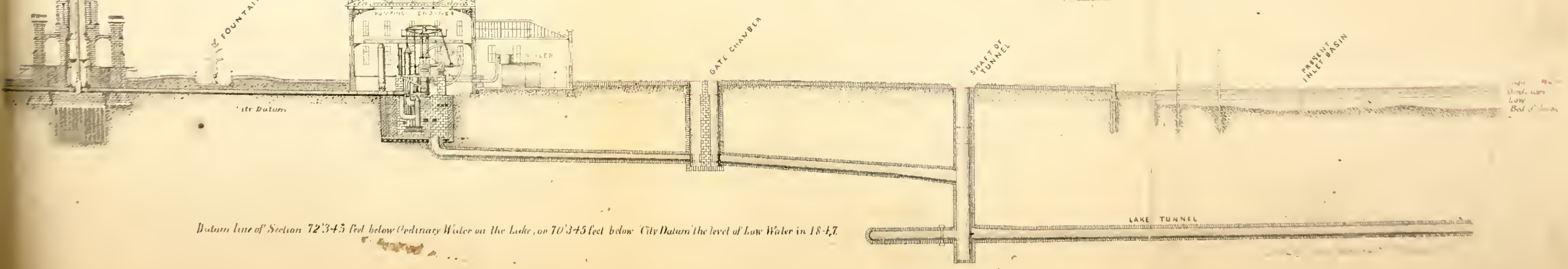
VERTICAL SECTION OF GATE CHAMBER.





DETAILS OF GATE
SCALE $\frac{1}{12}$





Datum line of Section 72'345 feet below Ordinary Water on the Lake, or 70'345 feet below "City Datum" the level of Low Water in 1847.

SECTION LAKE TUNNEL AND CONNECTIONS SCALE $\frac{1}{900}$

fe
g
fr
y
lc
tl
tl
b
ci
p
w
a
w

w
c
o
1
4
w
a
c
t
s
r

o
tl
d
sl
d
n
tl
cl
a
d

cl

first let into it on the 8th of March, 1867, when only the horizontal portion was filled, this precaution being taken to avoid too sudden a pressure on the masonry. By the morning of the 11th the shafts were filled to the level of the lake. For the purpose of ascertaining if any defective workmanship existed where cavities on the outside of the masonry had been filled in, the water was pumped out of the tunnel sufficiently to permit the Engineer and three representatives of the city press to go upwards of half way towards the land. Not a brick was observed to be out of its place or to have started. The party not being able to push their boat any further without great discomfort, returned, but were upset and left in total darkness about 600 feet from the lake shaft to which they walked. Had this accident occurred a mile out, it would have proved very serious if not fatal to most of the party, as the water was too cold to be endured long.

After the examination the tunnel was again filled, and on the 24th, about 4 p. m., the mouth of the old inlet was cut off from the lake. Immediately the pumps, which were not stopped at all, drew down the surface of the water at the mouth of the inlet upwards of a foot. For a moment, it seemed to some of the bystanders as if the tunnel would not perform its intended office, but the next instant the water began to bubble up beautiful and clear at the top of the well, and continued to do so till the temporary connection was no longer needed; when this most pleasing and unexpected feature of the works ceased to delight the public.

The formal celebration of the completion of the tunnel and introduction of pure lake water, by appropriate public ceremonies, took place March 25th, 1867. From that time to this there has been no cessation in the supply, except three times, when stoppages of a few hours by anchor ice occurred. The experience thus far gained in this respect is believed to be sufficient to shew how to prevent the recurrence of such accidents.

Careful observations have frequently been made to ascertain the head required to deliver given quantities of water through the tunnel, and it is found to exceed in capacity the original estimates. No indications whatever of internal injury to the structure have yet been observed.

ESTIMATE AND COST.

The original estimate of the probable cost of the work was $307,552. The actual cost, including all preliminary and other expenses of whatever nature, chargeable to the Lake Tunnel, up to April, 1867, was $457,844.95, made up of the following items, viz:

Engineering and Superintendence	$28,774.02
Printing and Advertising	375.13
Miscellaneous	6,250.03
Labor	2,096.20
Lumber	1,142.72
Piles	1,258.29
Hardware	53.85
Castings	597.55
Lake Shaft	12,629.86
(Gates and Gate Chambers of Lake Shaft, not included in contract of Dull & Gowen.)	
Dredging for Crib	1,500.00
Tugs, for Board and employes	6,718.17
Discount on Bonds	14,685.35
Opening Celebration	979.18
Dull & Gowen, (Contractors)	380,784.60
	$457,844.95

The original estimate was made when common labor was worth $1.25 a day, which up to that time had been considered a very high price. It was also made near the beginning of the war, before the difference between the values of gold and currency had much disturbed prices generally.

The original contract with Messrs. Dull & Gowen to construct the tunnel, was for $315,139. The final settlement with them was for $380,784.60, including $27,420 for extras on the tunnel proper, and $41,225.60 for extras on the shafts, crib and east and west extensions. In view of the prevalent feeling that the contractors must be very heavy losers by the work, a very liberal policy was pursued towards them in the settlement of extra claims, yet it was finally proved by the books of the contractors, that their profits were not less than $50,000. It should be mentioned, however, that they claimed to have made great sacrifices in the sale of private property at the beginning of their operations, when the bankers who had promised to loan them money refused to keep their promise, on account of the reported hazardous nature of the work, and the probable ruin it would bring upon the contractors.

Very soon after the completion of the land shaft, the contractors applied to the City Council for an increase of price, and also for monthly payments of 85 per cent., not only upon all work actually done and in place, but upon materials delivered on the ground. The original contract allowed but 75 per cent. upon work actually in place, and nothing on materials delivered but not in their permanent place. The increase of price was not granted, but the rest of the contractors' request was, thus increasing largely their monthly payments, especially on account of the crib, on which they could otherwise have received nothing until after it was secured in its position. About a year before the final completion of the work, the contractors made a second application to the City Council for an increase of price, and an ordinance was passed granting them an increase on their contract of 60 per cent., or upwards of $189,000. This sum was considered very extravagant by the Board of Public Works, who had always felt, and continued to feel, that some allowance should be made, but also felt that the proper time to do it would be at the close of the work, when, by a frank statement of the contractors, and exhibit of their books, their actual loss, if any, could be ascertained. The Mayor vetoed the ordinance, and no other of this nature has since been passed, although the contractors did make their third application after the completion of the work, but the actual exhibit of their books caused the committee to report against the measure.

From the statements and books of the contractors, the actual cost of the work they did, deducting profits, was not more than $330,500. The crib and outer shaft cost $117,500; the land shaft cost $12,000; the west extension and connection with the gate chamber, no part of the original contract, cost $6,000, leaving

$195,000 as the cost of the tunnel proper. This being 10,567 feet long, made the cost to the contractors $18.45 per lineal foot. The original estimate of cost to the city was $13.54. The usual prices paid during the work, for common labor, $2.00; masons, $5.00, and engine men, $3.00 per day; for brick, $14.00 per thousand, and cement, $2.75 per cask of 300 lbs.

GENERAL SUPERINTENDENCE AND CONSULTATION.

On the part of the contractors, the general charge of the work was taken by Col. Gowen, who was rarely absent from the city. Mr. Dull was very seldom here, but was of much service to the firm by his counsels. These gentlemen persevered through great discouragements, not so much from the intrinsic difficulties of the work itself, as from injury to their credit by the reported risks they had to encounter; and from the appalling rise of gold, and consequently of prices, before they finished. Their final success was complete and very gratifying.

Under the Board of Public Works, the general charge was taken by the City Engineer, who visited the work daily at first, and afterwards several times a week. Erastus W. Smith, Esq., of New York, was consulting Engineer in all matters relating to the iron cylinders and gates. It was supposed at first that the shafts would have to be sunk by the pneumatic process. Mr. Smith believed, as soon as he was consulted on the subject, that this expense and trouble might be saved, and the event proved the correctness of his judgment. Mr. Smith aided the City Engineer in obtaining important advice from Mr. Webb, the eminent shipbuilder, and others, relative to the construction of the crib.

It should be said in this connection that, by the advice of Capt. Swift, before the construction of the crib was commenced, Col. Hartman Bache, U. S. engineer, was visited at his office in Philadelphia and consulted. He examined the plans of that structure and pronounced them entirely safe.

SCIENTIFIC AND OTHER ITEMS.

Connected with the construction of a work of this kind, there was necessarily very much of interest that cannot here be repeated. The journals of the day published many articles relative to the tunnel, some purely descriptive, some speaking favorably of the enterprise, and many unfavorably. Since its completion, visitors to the city who reside hundreds, and in some cases thousands of miles away, frequently say, "we watched the progress of your work with great interest." The Academy of Sciences of this city had representatives, Drs. Jewell and Andrews, who made numerous observations relative to the geological developements by the excavations for the tunnel. The result of these has already been published in different forms, in Silliman's and other scientific journals.

Observations on sound were frequently made during the progress of the work. The first distinct notice of anything of this kind was when the tunnel had been made one hundred yards from the land shaft. Just above the tunnel is the breakwater enclosing the inlet basin. The outside of the breakwater consists of round piles, placed one to two feet apart. The waves could be distintcly heard in the tunnel below, striking those piles, through 60 feet of earth. The next observation was the passing of propellers and tugs, when the tunnel reached half a mile or more out. The different noises made by a vessel or engine passing overhead could be heard as distinctly through 30 to 40 feet of earth as on the surface of the water. It was considered a matter of much interest to determine how far sound could be heard through the clay. The miners thought it could not be more than 150 to 200 feet. In order to be certain, observations were made when the faces were 800 feet apart, and sounds of blows of iron on stone or iron in the clay, but not on the clay itself, could be heard with great distinctness. Whether the sounds passed through 800 feet of clay, or first through 30 feet of clay, then through 800 feet of water and then through 30 feet of clay, is a question—probably the latter.

It is believed that the accompanying drawings of different parts of the work will be understood without further explanation.

SEWERAGE.

A full statement of the operations of this department will be found in the following report of the Principal Assistant:

CHICAGO, March 31, 1869.

To E. S. CHESBROUGH, ESQ., *City Engineer:*

SIR: Herewith is presented a report for the year ending with date, of the extent and location of the sewers laid, of catch basins and manholes built, of the repairs and cleansing of the sewers, and of the permits issued for private drains to connect with them during the said year.

LENGTH IN FEET OF SEWERS BUILT TO APRIL 1, 1869.

Diameter in feet.	S. DIVISION.		W. DIVISION.		N. DIVISION.		TOTAL THREE DIVISIONS.			
	Previous to April 1, 1868.	From April 1, 1868, to April 1, '69.	Previous to April 1, 1868.	From April 1, 1868, to April 1, '69.	Previous to April 1, 1868.	From April 1, 1868, to April 1, '69.	Totals previous to April 1, 1868.	Totals April 1, 1868, to April 1, '69.	Total Sewers.	Average cost pr ft. 1868, '69.
6	1,419	....	1,292	....	3,895	....	6,606	....	6,606	......
5	4,267	721	30,855	....	13,756	....	48,878	721	49,599	7.47
4½	1,033	....	31,569	....	6,238	....	38,840	....	38,840	......
4	4,317	....	22,252	1,806	7,053	....	33,622	1,806	35,428	5 84
3½	....	....	1,332	751	....	....	1,332	751	2,083	5.72
3	18,803	174	2,405	5,268	6,699	1,391	27,907	6,833	34,740	4.53
2½	44,007	1,358	....	575	3,544	2,326	47,551	4,259	51,810	3.51
2¼	6,359	....	....	....	....	....	6,359	....	6,359	......
2	39,247	1,984	72,410	7,647	53,034	4,339	164,691	13,970	178,661	2.91
1	76,533	4,360	42,267	11,689	39,864	3,452	158,664	19,501	178,165	1.67
Totals.........	195,985	8,597	204,382	27,736	134,083	11,508	534,450	47,841	582,291	
Total by Div's	204,582		232,118		145,591		$101\frac{1170}{5280}$ Miles.	$9\frac{321}{5280}$ Miles.	$110\frac{1491}{5280}$ Miles.	

CATCH BASINS AND MANHOLES BUILT.

	Built from April 1, 1868 to April 1, 1869.			Previously Built.	Total.	Average Cost, 1868-9.
	S. Div.	W. Div.	N. Div.			
Catch Basins...	160	222	98	2,652	3,132	69.01
Manholes........	45	165	83	3,582	3,875	20.00

There remains to be executed of the contracts of 1868, for sewers in the West Division, about 4,300 feet of sub-main and pipe sewers, at a cost of about $4,500.

Of the nine miles of sewers built in 1868, about 5,000 feet have been laid at the expense of private parties, and for which certificates have been issued by the Board to the amount of $7,313.14, payable when the sewers shall be laid in the respective localities of the work.

Over two miles of the sewers laid in 1868 were required to be put in in advance of pavements ordered, either sewers on the streets to be paved or wing sewers across the same streets, to avoid the future disturbance of the pavement. This work it was necessary to do without delay, and it was executed as required by the Board, at a cost of about $20,000.

Detailed Statement of Sewers built from April 1, 1868, to April 1, 1869.

SOUTH DIVISION.

LOCATION.			LENGTH OF SEWERS IN FEET.				
ON WHAT STREET.	FROM	TO	5 ft.	3 ft.	2½ ft.	2 ft.	1 ft.
South Halsted	River	Archer av	721				
Archer av	Halsted st	Eastward		51			
East 18th	Dock face	Eastward		123			
Wabash av	26th st	29th st			1358		
East 18th	Grove st	Wentworth av				540	
Archer av	Halsted st	Westward				58	
Grove	18th st	North				61	
Wentworth av	18th st	North				54	
Calumet av	22nd st	21st st				524	
23d street	E. line Cottage Grove	West line 21st st				65	
Prairie av	23rd st	Southward				353	
Kankakee av	22nd st	Southward				40	
Wing sewers across Archer Avenue.	at Buddan st	Southward				75	
	at Arnold st	Northward				79	
	at Clark st	Northward				135	
	at Butterfield st	North and south					130
	at Burnside st	North					66
	at Finnell st	Eastward					95
	at Wentworth av	Northward					80
	at Bushnell st	South-eastward					61
24th street	Wabash av	Eastward					240
23d “	Calumet av	East and west					71
25th “	Prairie av	East and west					74
Franklin	Alley Block 53	Alley B. 54 O. T.					81
Indiana av. wing sewers.	East and west at	23rd st					75
	“ “ “ “	24th st					76
	“ “ “ “	25th st					75
	“ “ “ “	29th st					74
Michigan av. wing sewers.	“ “ “ “	23rd st					68
	“ “ “ “	24th st					68
	“ “ “ “	25th st					68
	“ “ “ “	29th st					68
	West at	28th st					34
Wabash av. wing sewers.	East and west at	23rd st					68
	West at	24th st					34
	East and west st	25th st					66
Prairie av	Prairie av. sewer S. E.	to E. line Cot. Gr. av.					46
18th street	Wentworth av	State st					1200
Wing sewers on 18th st.	at Grove st	Southward					58
	at Wentworth av	Southward					49
	at Blackwell st	Southward					54
	at Arnold st	North and south					104
	at Butterfield st	North and south					105
28th street	Across	Wabash av					68
29th “	Across	Wabash av					68
18th “	Indiana av	Eastward					185
20th “	Indiana av	Eastward					183
25th “	Wabash av	Eastward					250
21st “	Wabash av	Eastward					205
Butterfield	19th st	Southward					108
Totals			721	174	1358	1984	4360

WEST DIVISION.

LOCATION.			LENGTH OF SEWERS IN FEET.					
ON WHAT STREET.	FROM	TO	4 ft.	3½ ft.	3 ft.	2½ ft.	2 ft.	1 ft.
Halsted st	River	22nd st	1121					
18th st	Lumber st	Canal st	685					
Halsted st	22nd st	Canalport av		751				
Halsted st	Canalport av	Luke st			752			
Chicago av	Putnam st	Milwaukee av			2658			
Erie st	River	Milwaukee av			1752			
Wright st	Halsted st sewer	East and west			106			
Halsted st	Luke st	Evans st				575		
Halsted st	Evans st	16th st					546	
Desplaines st	Van Buren st	Harrison st					803	
Sangamon st.	Fulton st	Carroll st					415	
Ann st	Randolph st	Lake st					463	
Ada st	Randolph st	Lake st					497	
Halsted st	Chicago av	Southward					73	
Reuben st	Chicago av	Cornelia st					692	
Hoyne st	Washington st	Warren st					353	
Robey st	Washington st	Park av					358	
Peck st	Carroll st	Depot place					310	
Canal st	Van Buren st	Sebor st					1193	
“	Mather st	Ewing st					606	
“	Forquar st	Dekoven st					610	
“	Bunker st	12th st					356	
Morgan st	Taylor st	South					90	
Desplaines st	Van Buren st	South					63	
Bishop Court	Washington st	South					38	
South-Western av	Washington st	N. E and S. W.					105	
Loomis st	Adams st	North and south					76	
Gurley st	Blue Island av	West						76
Hope st	“ “ “	West						72
Ewing st	“ “ “	East						56
11th st	“ “ “	East and west						103
Forquar st	“ “ “	East						62
Morgan st	“ “ “	North						100
Sebor st	Halsted st	East						50
Mather st	“	East						50
Ewing st	“	East and west						110
Forquar st	“	East and west						102
Dekoven st	“	East						50
Bunker st	“	“						50
Dussold st	“	“						50
O'Brien st	“	“						50
Kramer st	“	“						50
Liberty st	“	“						50
Mitchell st	“	“						50
Barber st	“	“						50
Catherine st	“	“						50
Meagher st.	“	“						50
Meridian st	“	“						38
Centre av	“	“						36
Indiana st	Desplaines st	West						57
Wayman st	“	East and west						116
Meridian st	“	West						55
Lydia st	“	“						58
Eagle st	“	“						55
Centre av	“	“						58
Quincy st	“	“						58
Pierce st	“	“						64
Depuyster st	“	“						68
School st	“	East and west						118
Wayman st	Jefferson st	West						58
School st	Jefferson st	East and west						117
“	Clinton st	East and west						118
“	Canal st	West						50
Throop st	Adams st	North						40
Fourth st	Desplaines st	Green						1172

WEST DIVISION.—CONTINUED.

LOCATION.			LENGTH OF SEWERS IN FEET.					
ON WHAT STREET.	FROM	TO	4 ft.	3½ ft.	3 ft.	2½ ft.	2 ft.	1 ft.
Washington st	Bishop Court	South-Western av						246
Lake st	Sangamon st	Reuben st						4345
Canal st	Sebor st	Mather st						226
"	Ewing st	Forquer st						246
"	Dekoven st	Bunker st						237
Judd st	Canal st	Westward						191
Ann st	Washington st	Northward						154
Reuben st	Cornell st	Cornelia st						275
Warren st	Hoyne st	Eastward						205
"	"	Westward						135
Park av	Wood st	Westward						470
"	Robey st	East and west						740
Elizabeth st	Washington st	North						173
Halsted st	Sebor st	Mather st						223
"	Ewing st	Forquer st						206
Totals, West Div			1806	751	5268	575	7647	11,689

NORTH DIVISION.

LOCATION.			LENGTH OF SEWERS IN FEET.			
ON WHAT STREET.	FROM	TO	3 ft.	2½ ft.	2 ft.	1 ft.
Larrabee st	Chicago av	Oak st	1391			
Larrabee st	Oak st	Division st		1238		
Wells st	Division st	Granger st		371		
Wells st	North av	Carl st		717		
Chestnut st	Clark st	Dearborn st			379	
Wells st	Granger st	Goethe st			306	
Wells st	Carl st	Sigel st			923	
Carl st	Wells st	La Salle st			442	
Grant st	Clark st	"			411	
North av	Wells st	"			422	
Washington place	Clark st	Dearborn st			360	
Division st	Clybourn av	Larrabee st			944	
Granger st. wing	Wells st. sewer	Westward			38	
Sigel st. "	" "	"			38	
Schiller st. "	" "	"			38	
Goethe st. "	" "	"			38	
Schiller st. "	" "	Eastward				52
Goethe st. "	" "	"				55
Wells st	Sigel st	Goethe st				301
La Salle st	298 ft. N. of Schiller	North av				966
Dearborn st	Division st	Southward				140
Dearborn st	256 ft. N. of Burton pl.	Northward				260
Townsend st	Chicago av	White st				816
Wesson st	Chicago av	Northward				130
Franklin st	White st	Oak st				562
Chicago av	250 ft. E. of Pine st	Eastward				170
Totals, North Div.			1391	2326	4339	3452

REPAIRS OF SEWERS, CATCH BASINS, MANHOLES AND COVERS.

DIVISIONS.	Repairs of Sewers.		Repairs of Catch Basins & Manholes.		Repairs of Covers.		Totals Each Division.
	Ft. rep'd & relaid.	Cost.	No. rep'd.	Cost.	No. repd and restored	Cost.	
South Division........	477	$819.57	143	$990.96	....	$1,564.55	$3,375.08
West Division..........	86	481.24	78	1,278.62	....	2,052.80	3,812.66
North Division........	1385	2,041.86	106	1,029.34	....	1,028.14	4,099.34
Totals 3 Divisions......	1948	3,342.67	327	3,298.92	....	4,645.49	$11,287.08

It will be observed that the repairs were most required in the South and North Divisions of the city, where the height of the ground over the sewers is, on the average, less than in the West Division. As the streets are filled up and the sewers properly protected from frost and traffic the occasion for repairs ceases.

It is recommended that all streets where there is not 2½ feet over the sewers should be filled up to that height, even if they are not to be filled to grade and paved.

CLEANSING OF SEWERS.

Method of Cleansing.	S. DIVISION.		W. DIVISION.		N. DIVISION.		TOTALS.		
	Feet Cleansed.	Cost.	Feet Cleansed.	Cost.	Feet Cleansed.	Cost.	Feet Cleansed.	Cost.	Per 100 ft.
By Flushing.........	125,510	$3,274.38	91,300	$1,032.29	72,620	$1,837.89	289,430	$6,144.56	$2.12
By Chain Machine	50,570	4,892.72	35,290	4,084.41	18,330	3,439.77	104,190	12,416.90	11.90
Totals...........	176,080	$8,167.10	126,590	$5,116.70	90,950	5,277.66	393,620	18,561.46	ave'ge 4.71
Catch Basins Cleaned. } ...	No. of 1108	2,970.44	No. of 1153	3,471.77	No. of 802	1,950.39	No. of 3,063	8,392.60	each, $2.74
Total cost of cleansing 3 Divisions.....		11,137.54		$8,588.47		$7,228.05	For 1867-8.	26,954.06 26,540.81	

It will be remarked that although the extent of the sewers has been much increased during the past year, the cost of cleansing is but very little more than that for the previous year. This is to be attributed to the increase of the extent of the paved streets, from which very little enters the sewers that cannot be removed by flushing, which, it may be noticed, is much the cheapest method.

It should be borne in mind that in designing a sytem of sewers for a city as level as Chicago, it was intended that every precaution should be taken to exclude any substances that water would not carry; nor was it expected that they would be entirely self-cleansing. In fact, the experience of other cities in this country and in Europe, shows that the annual cost of cleansing ($245 per mile) is not an extraordinary one.

PRIVATE DRAINS.

Permits for private drains to be connected with the sewers have been issued as follows, during the year ending April 1, 1869:

Part of City.	6 inch Drains.	9 inch Drains.	12 inch Drains.	Total in 1868–9.	Total laid previously.	Total to April 1, 1869.
South Division, ..	750	21	5	776	....	....
West Division,...	1379	34	6	1419	....	....
North Division,..	1055	10	1	1066	....	....
	3184	65	12	3261	12563	15824

All of the above drains have been inspected and platted upon the maps of the office.

Yours respectfully,

WILLIAM H. CLARKE,
Principal Ass't Engineer.

CONDITION OF THE RIVER.

No change in this respect can be reported. The increase of population, and of insalubrious manufactures along the river and branches must increase its offensive condition; but the effect of pumping at Bridgeport in dry seasons, on the one hand, and the restrictions upon the manufacturing establishments relative to their discharging into the river, by the Board of Health, on the other, prevent any increase of offensiveness from becoming manifest.

HARBOR.

Since the National Government has resumed not only the control but the actual execution of the works necessary for the preservation to the entrance of the harbor, all important expenditures on the part of the city for this purpose have ceased. Occasional soundings have been made, to show to Col. Wheeler, U. S. Engineer in charge of lake harbors, when and where dredging was required, which he has always been very willing to have done, as far as funds at his disposal would allow. Although the entire entrance to the harbor has not been as thoroughly dredged as was thought desirable, still, there has always been a channel sufficiently deep for vessels drawing the most water, provided they were towed out or in by skillful tugmasters. Occasionally, however, for the want of proper skill or care, or owing to unavoidable accidents while passing the bar, during high winds, vessels have occasionally got aground for awhile, and one or two have been driven on the south bar and wrecked.

The city is still required to keep up a light at the end of the north pier extension. It is hoped and believed that the Government will assume the expense and care of this before long.

WASHINGTON STREET RIVER TUNNEL.

This work having been completed under the efficient management of Messrs. J. K. Lake, Charles B. Farwell and A. A. McDonell, the contractors, a description of it, promised in the last annual report, will now be given.

PRELIMINARY STEPS.

Before giving an account of the various movements which led to the final construction of this work, it may be interesting to notice the increase of difficulties in crossing the river, and the various plans adopted or proposed for removing them.

The first bridges across the river were floating structures, and of course when closed could not allow the passage of vessels of any kind. The next kind of bridges were similar to the present ones, turning on their centres, but placed so low as scarcely to allow a canal boat to pass under them, and had to be opened for every tug or larger vessel. As the population and commerce of the city increased, the crossing of the river was more and more frequently obstructed by the passage of vessels; but the rights of navigation were considered paramount to all others on the river, and vessels could not be detained at all by the bridge, no matter what number of vehicles or individuals might be prevented from crossing. The first interference with the absolute rights of navigation was in requiring the tugs to lower their smoke-stacks when passing under the bridges that had been placed high enough. There was quite a rebellion against it by the tug masters for a day or two, but it soon ended, and there has been none since against so reasonable a regulation. This reduced the necessity of opening the bridges so often, and consequently afforded much relief. As the business of the city increased, the obstruction to the land travel in crossing the river was greatly increased, notwithstanding the raising of the most important bridges high enough to let the tugs pass under them. Occasionally the bridges would be kept open a half hour at a time, in some rare cases a whole hour. This state of things continued till nearly two years ago, when the present ordinance, which does not allow the land travel to be continuously stopped more than ten minutes at a time during the day, was passed. It has afforded great relief, but the inconvenience to the land traffic, though much diminished, is still a matter of serious and just complaint.

Early efforts were made to set on foot projects for constructing tunnels under the river, and thus avoiding the inconvenience of waiting at the bridges for the passage of vessels. In 1853, a company for the purpose having been formed, with the Hon. W. B. Ogden at its head, plans were proposed for such a work both in masonry and in iron. Among these plans were those of Messrs. Wm. Gooding, Ed. F. Tracy, and Thos. C. Clarke. Had the company constructed the work it was their intention to adopt Mr. Clarke's plan, which was for a wrought iron tunnel; because its estimated cost was less than that of a tunnel in masonry, and it could have been constructed without much interference with navigation.

Owing to the more general adoption of turn bridges about this time the great necessity for tunnels was removed and the probability of their yielding a satisfactory income much diminished. This led to the abandonment of the project for some years. From that time to the present, various plans have been proposed for tunneling under the river, mostly with wrought or cast iron tubes, to be sunk into trenches dredged for them. These were not sufficiently elaborated to show how they could be successfully united with the masonry or land portions, and were mostly by parties who had evidently not considered all the practical difficulties to be overcome.

On the 25th of April, 1864, the Chicago Tunnel Company, now headed by Mr. S. S. Hayes, petitioned for the passage of an ordinance authorizing them to construct tunnels under the Chicago River at Franklin and Lake streets.

Pending the action of the City Council on the above ordinance, the Pittsburgh, Fort Wayne and Chicago Railway Company petitioned for the construction of a *free* tunnel at Adams street, offering to subscribe $25,000 towards it, or $15,000 for one on any other street as far north as Washington street, provided Adams street between Canal street and the river, should be vacated.

November 14. S. B. Gookins and others petitioned for the passage of an ordinance appropriating $100,000 for the construction of a tunnel under the river at Washington street.

January 9, 1865. After various petitions and remonstrances had been considered, the City Council passed an ordinance intended to authorize the Board of Public Works to construct a tunnel under the river at Washington street, appropriating for that object $100,000 in city bonds, provided $100,000 more could be obtained by subscription.

During the various movements of the City Council relative to a river tunnel, the Board of Public Works frequently discussed the plan of such a work among themselves, and the President, Mr. Gindele, himself a civil engineer, prepared very finely executed drawings of it. These were referred to the City Engineer, with the request that he would shew them to such of his professional brethren as he might be able to consult, and then to make such changes as he should think advisable. No changes in the general outline of the plan were thought necessary. On account of possible danger from the dragging of anchors or the sinking of heavily loaded vessels over the tunnel, the roof of the river portion was considerably strengthened.

March 27. The specifications for the tunnel were read before the Board of Public Works by the City Engineer, discussed and finally approved. The Board then directed the Secretary to advertise for bids for the work.

June 26. After bids had been received for the work, and the city council had approved of its being let, it was discovered that there was no legal ordinance authorizing the construction of the tunnel.

July 27. A legal ordinance was passed, authorizing the construction of the work and appropriating $100,000 in bonds for it, provided other parties should contribute $100,000 more.

September 4, 1865. The City Council directed the Board of Public Works to proceed at once, in accordance with the City Charter and the ordinance last passed, to award the contract for the construction of the tunnel to the lowest bidder.

The Board accepted the proposition of Mr. Jas. H. Moore, to build a tunnel under the river at Washington street for $200,000, on the conditions of the ordinance, and according to a plan of his own very similar in its outlines to the one adopted by the Board, but with less costly materials, in some of its parts, and with the omission of a considerable portion of counter-arching on each side of the river.

December 11. The Comptroller in answer to a previous inquiry by the City Council as to how much had been subscribed for the construction of the tunnel, and what was the prospect of the commencement and completion of "this necessary public improvement," reported that he did not know.

March 12, 1866. The subscription for Washington street having failed, the majority of a committee of twelve of the City Council reported in favor of constructing the tunnel at Adams, the subscription for which was still offered.

April 30. The Board of Public Works, in view of various petitions for tunnels on different streets and the non-commencement by Mr. Moore of the one on Washington street, in consequence of the failure of the subscription for $100,000, recommended the construction of a tunnel under the river at State street.

May 7. The City Council requested the Board of Public Works to furnish, at the next regular meeting, an ordinance for a tunnel under the river at Washington street.

May 21. The Board reported that having already recommended the construction of a tunnel at State street, they did not feel it to be for the interest of the city to commence the construction of another.

June 27. A committee of nine of the City Council, in reporting upon a proposition to build a tunnel at Franklin street, recommended that in view of all the circumstances of the case, including the failure of the citizens to subscribe, the refusal of the City Council to adopt Adams street, and the increasing demand by the public for such a structure, a tunnel be constructed on Washington street. An ordinance carrying out this recommendation was passed, levying a tax of one mill on the dollar for the purpose, and repealing previous conflicting ordinances.

July 2. The ordinance last passed by the City Council was reconsidered.

July 17. After having received a petition for a tunnel on Clark street, the City Council passed a final and enabling ordinance and requested the Board of Public Works "to proceed as soon as possible" with the construction of the tunnel on Washington street.

August 23, 1866. Nineteen bids were received; ranging from about $247,000 to $430,000. The one accepted was that of Messrs. Stewart, Ludlam & Co., with whom a contract, dated August 31, to do the work for $271,646, was entered into. By this agreement the Contractors were to furnish all the materials and do all the work required to complete the tunnel. With regard to coffer-dam, bracing, &c., they were to be restricted in their choice of plan or materials only so far as the permanency of the work or the safety of the public might require.

CONSTRUCTION.

The contractors broke ground west of the river October 2, and east of the river October 11. They excavated to a depth of 37 feet just east of the river and removed a large portion of the earth as far as Market street, making a cut with perpendicular sides, which they supported with inferior bracing. West of the river they removed the earth from the upper portion of the cut between Clinton and West Water streets. They also drove most of the piles necessary for their east coffer-dam, and delivered about 4000 cubic yards of sand for the masonry, none of which, however, they ever built. December 23 a portion of the bracing east of the river gave way, but was soon repaired. Owing to the want of sufficient funds, the contractors were unable to carry on their work satisfactorily. The Board suspended payments, and on the 17th of May, 1867, the contractors abandoned the work, after having received up to that time $20,584.57. On the 14th of June the abandoned excavation east of the river caved in.

While Messrs. Stewart, Ludlam & Co. had the contract for the work, a very important change in the plan of the tunnel, first advocated by Mr. Letz in the Board, was discussed by both the Board and the City Council, and finally adopted. It consisted in prolonging the footways on each side of the river so as to admit of easy slopes instead of steps for two thirds of the ascent. This made it necessary to take the footway from the middle of the tunnel and put it on one side. A more exact description will be found below.

July 11. New plans and specifications having been prepared, and the work advertised for re-letting, the Board received nineteen bids, ranging from about $291,000 to $436,000. That of Mr. J. K. Lake was finally accepted, but in the contract, which was dated July 20, 1867, Messrs. Chas. B. Farwell and J. Clark were associated with him. The whole of the work specified, including all materials, labor, coffer-dam machinery, and whatever else might be necessary to complete the work according to the specifications, was to be done for $328,500. They were to receive monthly payments of 85 per cent. on account of work actually done and in place, but nothing on account of temporary work or materials delivered but not in place.

The contractors commenced operations July 25. They laid the first stone in the south retaining wall near Franklin street, August 13, and commenced the foundation of the main archway, east entrance, September 27, and put in the key-stone October 31. The corresponding work on the west side was about two weeks behind this. The masonry on the main arch east of the river was carried to near the middle of Market street, when, owing to the severity of the weather, operations were suspended on both sides of the river for the winter.

The operations of the contractors were carried on during the working season of 1867 with energy and without serious interruption except from the breaking of a water pipe on Canal Street, which caused some delay and extra expense in pumping. The earth was hoisted up and the stone, brick and other materials for the masonry lowered down by a steam derrick on each side of the river, moved from point to point as the work required. The bracing work consisted of 12×12 in. upright pine timber placed generally about 12 feet apart on each side of the excavation. Behind those uprights were placed 4×6 in. pine lagging, generally close together, as the clay was found to swell and press in considerably on exposure. The uprights were held in position by horizontal 14×16 in. pine braces placed generally every 5 ft. above each other. At the ends of the braces cast iron screws and sockets were placed, by means of which they were easily tightened to support the banks, or loosened when the masonry was sufficiently advanced to admit of their removal.

Before the close of the season Mr. Clark withdrew from the contracting firm and Mr. A. A. McDonell was admitted.

About the first of April, 1868, the contractors, having prepared during the winter improved hoisting machinery, resumed operations and continued them with great energy, part of the time night as well as day, until the work was completed.

The contractors not being satisfied with the coffer-dam commenced by Messrs. Stewart, Ludlam & Co., constructed a new one on the east side of the river. This enclosed a rectangular space of 150 feet along the dock and 110 feet into the river. The dam itself was constructed in the usual manner with supporting and sheeting piles and wrought iron tie rods, with a clear space between the sheeting of 15 feet that was filled in with clay. Within the coffer-dam and on each side of the work there was a platform 25 feet wide, on which materials and hoisting machinery were placed.

A serious accident at the crossing of the railroad on West Water street occurred on the night of the 2d and 3d of September which caused considerable expense and delay to the contractors. It was owing to the yielding of the braces on the north side, during a heavy storm of rain, the whole difficulty being probably much increased by the breaking of a water pipe.

A leak in the east coffer-dam began on the 4th of September to be troublesome. It increased so rapidly, notwithstanding the most vigorous efforts to prevent it on the inside, as to drive the workmen out. After various mistaken surmises as to the cause of the leak through the dam, and consequently useless efforts at stopping it, the contractors drove a square pile across what they supposed might be its course, and stopped it immediately.

When the work within the easterly coffer-dam was finished, a bulkhead was built on top of the flagging over and near the end of the arch, connecting the two sides of the coffer-dam. Then the portions of the coffer-dam between the bulkhead and the east side of the river were removed and navigation restored. Then the west side coffer-dam was completed in very much the same manner as the other. Although the contractors placed clusters of piles firmly driven and tied around with strong chains they found it very difficult to keep passing vessels from injuring that structure. On the other hand, it cannot be denied that the coffer-dam was a nuisance to navigation.

Immediately after the commencement of operations in the west coffer-dam, and the removal of the clay from the face of the masonry built in the east coffer-dam, a crack, with a troublesome leakage through it, was discovered on the face of the south abutment of the foot-way. At first this was reported to be owing to the striking of an anchor over head; but besides being nearly 30 ft. from where any anchor could have struck, the crack was found to extend entirely across the whole mass of masonry in the tunnel, from north to south and from top to bottom. It was undoubtedly caused by the "creeping" of the clay towards the open space in the west coffer-dam. A similar crack occurred entirely west of the river, where the masonry had been suspended for some time in consequence of the accident at West Water street, but this not being under the river caused no leakage.

No serious leakage occurred in the west coffer-dam, but considerable difficulty was experienced from the occasional shocks of vessels against the north and south sides.

By the first day of January, the arches were all completely turned, and the whole work was in a state to enable the contractors to celebrate the day by taking the Mayor, City Council, Board of Public Works, Fire Department and others through it.

Much pains was taken to prevent leakage through the roof of this tunnel, by the use of Asphaltum prepared in the form of "Government Mastic" on Governor's Island New York, under the direction of the United States Engineers, and sold at cost by the War Department to the City. Owing to the necessity of using it in frosty weather, on a frequently frozen bed, it was impossible to do it with that thoroughness that might have been attained under other circumstances. Portions of the archway were covered with a composition of coal tar, lime, &c., by Mr. S. J. Russell.

The amount of water which comes through and shows itself on the upper arches and sides is not large in amount, but as it freezes, the accumulations become in time sufficient, if not removed, to obstruct the passage of vehicles through the tunnel. Besides the usual method of seeking out and calking the leaks, one by one, there is good reason to believe, from past experience, that the leakage into this tunnel will of itself diminish more and more. This has been strikingly the case with the older portion of the work, particularly on the east side.*

As the work was finally constructed the following is a

DESCRIPTION OF THE TUNNEL.

The tunnel is located with its centre line in the centre of Washington street. The eastern approach commences in the centre of Franklin street, and the western terminates in the centre of Clinton street. The grade at Franklin street is 11.5 feet, and the grade at Clinton street 13.5 feet above low water or city datum line.

The bottom of the tunnel, or top of invert, in the centre of the river, is 32.4 feet below low water or city datum. The grades between the ends of the approaches and the centre of the river are uniform, except 101 feet each way (east and west) from the centre line of the river, in which there is a rise of 2.33 feet.

The tunnel under the river consists of three passage ways: the south one for foot passengers, and the other two for horses and vehicles drawn by horses.

The south passage way is 10.83 feet high between the bottom of the upper arch and the top of the invert. The width of this

---

*At the date of going to press, December, 1869, the leakage in the footway has been entirely stopped, and that in the drive ways so much reduced as to cause very little or no annoyance.

The contractors have been settled with and paid, including extras, $395,664.48. The total cost of this work to the City, including all preliminary expenses, superintendence and contingencies, discount on bonds, damages and miscellaneous items, up to October 31, is $512,707.57.

passage way is 10 feet. The upper arch is struck from three centres, and the lower one, or invert, is a segment with a radius of ten feet. The side walls are perpendicular from the springing line of the upper arch, 4 feet down on each side to the footings, which project horizontally 6 inches, and then drop perpendicularly 12 inches, then project six inches, and then drop perpendicularly 12 inches to the invert.

The other passage ways are 11 feet wide, their inverts segments, with a radius of 10 feet, their height 15 feet and ¾ inch, their upper arches are struck from three centres. The perpendicular walls or piers between the passage ways are two feet thick, the north abutment is 5 feet, and the south abutment is 4 feet thick. The bottoms of the middle walls are 4 feet thick. The bottom of the north abutment is 6 feet thick to the top of the skew back and 5 feet at the footing. The bottom of the north pier is 4 feet thick, and the bottom of the south pier 6 feet thick; both are on a level with the north abutment. The bottom of the south abutment is 5 feet 1 inch thick, and 4 feet 2¼ inches higher than the bottom of the north abutment. The inverts and upper arches are 22 inches thick. The backs of the abutments continue upwards perpendicularly to 3 feet above the springing line of the upper arches. Then a sloping flagging course commences, and rises in 6 feet, horizontal, to a point 16 inches above the top of the outside of the upper arches. This flagging course, which is 10 inches thick, is laid entirely across from one side to the other of the tunnel in the river, between the new dock walls, and the top of this flagging forms the bed of the river at this place.

The section of the tunnel above described extends entirely across the river, a distance of 222 feet. At the new dock line on each side the flagging course over the top of the tunnel terminates.

Beginning at a point 111 feet each way from the centre line of the river, the section of the tunnel changes to a single opening or passage way, beginning here with a width of 23⅓ feet, and diminishing to a width of 19½ feet in a distance of 40 feet, or to points 151 feet on each side from the centre line of the river. At the points 111 feet each way from the centre line of the river, the centre of the passage-way begins with a height between the top of the invert and the bottom of the top arch of 20½ feet.

The invert is 22 inches thick, and laid to a radius of 23.83 feet. The foundations of the abutments are 8 feet broad to a height of 5 feet 2 inches. The footing course above is 12 inches high and 7½ feet broad. The abutment then rises perpendicularly 7 feet, and is 7 feet thick. The upper arch is struck from three centres, with a total height above the springing lines at this point of 9 feet. The thickness of the upper arch is 34 inches on the sides, and 26 inches on top. The spandrels of the upper arch are backed with rubble masonry.

At the points 151 feet each way from the centre line of the river, the centre of the passage-way has a height of 18.83 feet between the top of the invert and the bottom of the upper arch. The invert, which to this point is 22 inches thick, is here reduced to 18 inches thick. The abutments are 7 feet 2 inches thick at the bottom, and for 3 feet 4 inches up, then 7 feet for 12 inches up, then 6½ feet for 12 inches up, and then 6 feet for 7 feet up. The upper arch is struck from three centres, with a total height above the springing line of 7¾ feet. The upper arch is 30 inches thick on the sides, and 22 inches on top. The spandrels are backed with rubble masonry. The section of the tunnel just above described extends from the point 151 feet east of the centre line of the river to a point 269¾ feet further east, or 420⅛ feet from the centre line of the river, and the remainder of the approach to the tunnel is open at the top, extending to the west line of Franklin street, a further distance of 273 feet, with side walls continuously diminishing in height and width of base. These walls are 25 feet high above the bottoms where they join the covered passage way, and 8 feet high on the west line of Franklin street, where they terminate. The bottom width of the walls is 4 feet at the west line of Franklin street, and 8¾ feet at the other end. The top width of each wall is everywhere 2 feet. The face of each wall is perpendicular, and the back is carried up in steps.

From the point 151 feet west of the centre line of the river to a point 362 feet further west, or 513 feet from the centre line of river, the section of the passage way is uniform throughout. At this point the uncovered passage way or approach to the tunnel begins and continues to the east line of Clinton street, with side walls the same in all respects as those on the eastern approach to the tunnel, except in length, which is 320 feet.

There is a wall on the east side of the river at the dock line 50 feet, and one on the west side 80 feet long. These walls are of rubble masonry, 6½ feet thick at bottom and 3 feet thick at top, and are carried up 8 feet above low water. They are 200 feet apart to provide for prospective widening of the river.

At the eastern and western ends of the covered passage-way, there is a face wall extending up to the grade or surface of the street above, of cut stone, rock-faced ashlar, with chisel-dressed margins.

Through each of the middle walls or piers of the tunnel there are eleven openings, each 3 feet wide.

There is, under the north passage way and near the lowest part of the tunnel, a well 5 feet in diameter and 15 feet deep. This well is connected by means of a 4 feet brick sewer 100 feet long, with a well 5 feet in diameter and 13 feet deep. The wells are of brick masonry, with walls 8 inches thick, and inverts of the same thickness depressed 4 inches in the centre. The sewer and wells are built in concentric rings, 4 inches thick, with a half inch mortar joint between them. Outside of the sewer and wells, and entirely around them, there is a coating of cement mortar one inch thick. The spaces between the excavation and sewer and wells and above the sewer to the bottom of the invert are filled in with concrete. The character of the bricks, mortar and cement, and the work of laying them, are the same as employed for the tunnel. The well near the centre of the tunnel drains the foot-passenger way, through a nine inch hard-burnt clay pipe laid in cement. The well at the east end of the tunnel under the river section is further carried up to the surface of the street in the form of a shaft in the stone abutment, from which shaft the water that collects in the well is pumped up by machinery, constructed for that purpose, within the chamber built at the top of the shaft. The chamber is built of rubble masonry, and its interior dimensions is 12 feet by 10 feet.

Broken stone drains are built at every 20 feet, at the back of the abutments, and are carried through the abutments to 4 inch drain pipes, to receive the water that collects from the surface above. These 4 inch drain pipes discharge into a 9 inch pipe sewer built or laid on the top of the inverts, and discharges into the well near the centre of the river.

Between the bottoms of the stone stairways, on each side of the river, in the foot passenger way, there is a pine plank pavement, 4 inches thick, laid lengthwise, and resting on joists 4×8 in., placed once in every 5 feet. The whole distance, including the stone platforms, being 811 lineal feet.

The open approaches to the tunnel on each side, and the passage-way for horses, are paved with wooden block pavement, (the whole distance being 1,608 lineal feet,) resting on lake shore sand.

The foundations everywhere under the tunnel, including all the covered archways, are of concrete, made by thoroughly mixing one measure of hydraulic cement with three measures of clean sharp sand in a dry state, and then mixing with the cement and sand water enough to make good mortar. Then with the mortar were incorporated five measures of broken stones, the whole mass being then worked till the broken stones were uniformly distributed throughout; the concrete was then laid in beds and rammed with wooden rammers.

The masonry is constructed of brick in the inverts, upper arches, piers above the inverts, and the faces of the abutments to an average thickness of 12 inches. It is constructed of stone in the bottoms of the piers and abutments, in the backs of the abutments, and in the spandrel backing of all the arches.

The inverts and upper arches are built in shells or parts of rings, 4 inches thick, with a floated joint of cement mortar between the shells of ½ an inch thick. The bricks in each course of the arches are stretchers, and laid so as to break joints with the bricks in the adjoining courses. The brick masonry in the face of the abutments is bonded into the stone masonry by projecting into it 8 inches further every other belt of 5 courses than the intermediate belts, thus making the brick work 8 inches and 16 inches thick in alternate belts.

The arches are covered with asphalt mastic mixed with five per cent. of prepared mineral bitumen, laid on a bed of lime mortar, then covered over with lime mortar five-eighths of an inch thick. The asphalt covering is from half an inch to five-eighths of an inch thick, and was laid on hot from the kettle, and well floated and jointed.

Two ventilators, one on the east side of the east dock wall and one on the west side of the west dock wall, are carried up to the level of the street. The internal diameter of each is two feet, with a thickness of wall of sixteen inches of brickwork.

The grade of the tunnel is 1 in 16 feet on the east side, and 1 in 18.626 feet on the west side. The grade of the passenger-way is 1 in 11.306 feet on the east side, and 1 in 12.076 feet on the west side. The grade east and west under the river is 1 in 42.863 feet, for both the main passages and the foot passenger way.

The entire width of Washington street is 80 feet. The sidewalks on each side of the street, near the open approaches, were reduced to 10 feet in width each. This left a carriage-way 18 ft. wide on each side of the open approach.

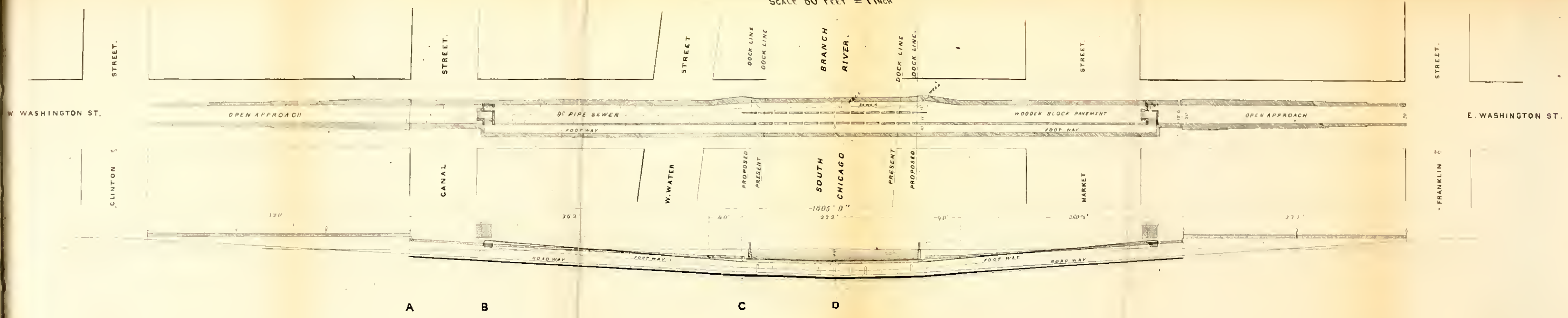
The accompanying illustrations, it is believed, need no further explanations.

In the earlier preparation of plans and estimates for the work, the City Engineer was assisted by Mr. Wm. Thomas, architect. From the first of November, 1866, to the present time, Mr. Wm. Bryson has been the resident Engineer, and has not only relieved the City Engineer of nearly all personal labor in connection with the work, but has by his skill and taste contributed much to the perfecting of the plans which had to be entirely remodeled when the change was made in the foot-passenger way. Mr. Bryson has been assisted in engineering matters by his son W. J. Bryson, and in the inspection of the work by Messrs. George Everett, Herman Kroeschell (for a short time) and E. F. Gobel, inspectors of masonry, James Webster, inspector of asphalt, and Michael Whelan and J. B. Sellers, inspectors of bricks and cement.

The contractors were their own general superintendents. They employed Mr. James Harper to superintend the construction of their coffer-dams. Their engineer at first was Mr. R. H. Colburn, and at the close of the work, especially in the final measurements, Mr. J. L. Mitchell was employed. Their Clerk was Mr. Robert Ranney.

PLAN AND SECTION OF TUNNEL
UNDER THE
CHICAGO RIVER AT WASHINGTON STREET.

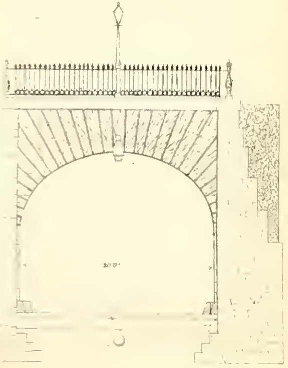
Scale 80 Feet = 1 Inch



Board of Public Works.
J. G. GINDELE.
1865 F. LETZ 1866
O. J. ROSE.

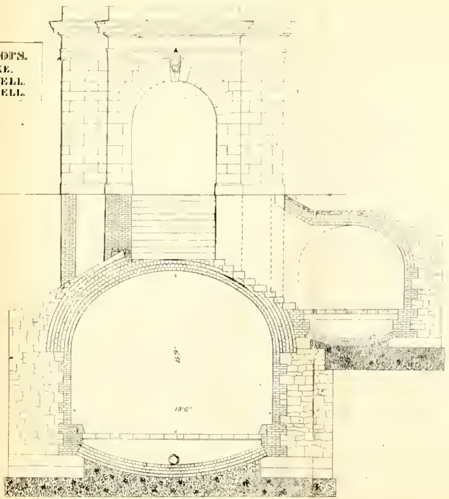
Board of Public Works.	**1868**	**Contractors.**
A. H. BURLEY	E. S. CHESBROUGH CITY ENGR	J. K. LAKE.
J. McARTHUR	W. BRYSON ASST ENGR IN CHARGE	C. B. FARWELL.
W. H. CARTER		A. A. McDONELL.

Lith by Chas Shober & Co Chicago



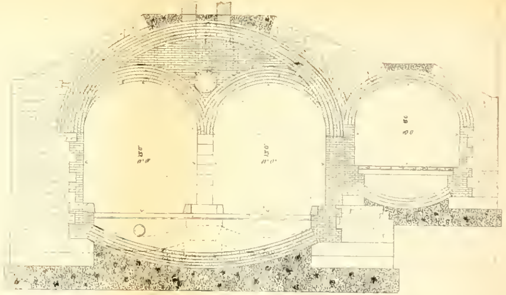
ELEVATION OF ENTRANCE TO CARRIAGE WAY AND SECTION OF RETAINING WALL.

FRONT ELEVATION OF ENTRANCE HOUSE.
EAST SIDE.

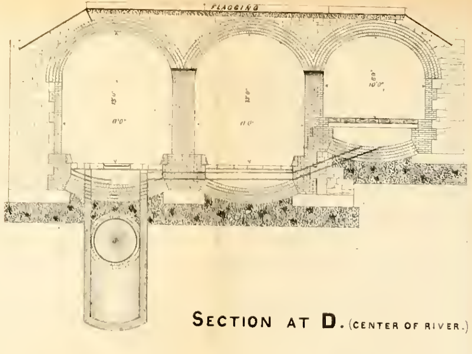


SECTION AT B.

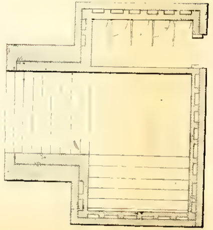
Scale 8 feet = 1 inch



SECTION AT C. (JUST EAST OF DOCK LINE.)

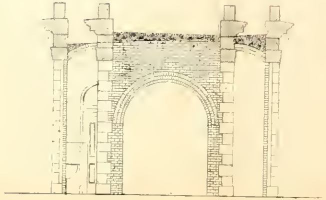


SECTION AT D. (CENTER OF RIVER.)

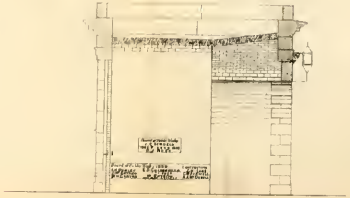


PLAN

ENTRANCE HOUSES.



SECTION LOOKING EAST.



SECTION LOOKING SOUTH.

OTHER TUNNELS UNDER THE RIVER.

Much time and labor have been spent in the preparation of plans and estimates for tunnels under the main river at State and LaSalle streets, and under the South Branch at Adams street; but as yet no conclusion has been arrived at with regard to them.

DOCK LINE SURVEY.

All labor and expense for this have ceased. Although the great cost of it seems to have been useless, as far as the main object was concerned, it is of frequent service in planning local improvements.

Respectfully submitted,

E. S. CHESBROUGH,

City Engineer.

FINANCIAL STATEMENT.

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WORKS, MARCH 31st, 1869.

WATER DEPARTMENT.

	Dr.	*Cr.*
Water Works,	$2,908,362 47	
Water Works Income,		$2,665,436 25
Water Works, New Tower,	91,491 80	
Water Loan Bonds, 6 %,		1,030,000 00
Water Loan Bonds, 7 %,		1,960,000 00
Water Loan Interest,	1,100,558 03	
Water Expenses and Repairs,	950,072 55	
Discount on 6 % Water Loan Bonds,	42,638 10	
Water Fund due City Treasurer,		12,390 49
Water Works Stock,	34,003 20	
Water Works Coal,	2,133 41	
Duncan, Sherman & Co., (Coupon account,)	76,320 00	
Water Works Service Cocks,	339 74	
Water Pipe Account,	33,863 96	
Pumping Works, stock on hand,	6,382 93	
Warren Foundry and Machine Company,		2,877 85
New Engine House,	146,528 87	
Van Buren Street Service-pipe,	670 00	
Clark Street Service-pipe,	1,567 96	
Halsted Street Service-pipe,	1,593 06	
Blue Island Avenue Service-pipe,	780 11	
State Street Service-pipe,	600 77	
Adams Street Service-pipe,	221 04	
Michigan Street Service-pipe,	757 55	
Washington Street Service-pipe,	127 60	
Twenty-second Street Service-pipe,	434 30	
Adams Street Service-pipe,	836 94	
Prairie Avenue Service-pipe,	141 38	
Harmon Court Service-pipe,	163 22	
Twelfth Street Service-pipe,	115 60	
	$5,400,704 59	$5,400,704 59

WATER FUND.

Statement of the cash receipts by the Board of Public Works, from April 1st, 1868, to March 31st, 1869, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time:

RECEIPTS.

Proceeds of 237 Bonds, including interest,	$237,283 48	
Water Tax collected,	420,656 84	
Received for tapping pipes,	14,226 60	
Received for letting on water,	806 80	
Received for setting meters,	2,387 07	
Received for sale of Hydrants, Materials and Labor,	2,599 03	
Pipe sold,	767 02	
Vouchers canceled,	948 53	
Coal sold,	342 75	
Plumbers' Licenses and Bonds,	66 00	
Tools sold,	11 80	
Over-remittance to Duncan, Sherman & Co. for int.,	100 00	
Stone sold,	140 00	
	$680,335 92	
Balance on hand, April 1st, 1868,	4,188 34	$684,524 26

EXPENDITURES.

ADDITION TO WATER WORKS.

DISTRIBUTING PIPES LAID.

		Cash Payment.	True Cost.
Cast iron pipe, 4, 6, 8 and 12 inch,	$147,982 34		
Trenching and backfilling,	24,748 68		
Testing and laying pipe,	19,879 93		
Tapers, caps, sleeves, bends and branches,	9,989 50		
Lead,	17,738 23		
Twelfth street syphon,	4,575 60		
Hauling pipe	2,692 76		
Brick,	1,002 60		
Lumber,	1,016 29		
Cement,	1,516 65		
Repairs of Tools,	150 85		
Plumbing,	470 07		
Steel,	155 49		
Gasket,	395 87		
Tools,	355 58		
Coal,	230 41		
Nails and spikes,	297 44		
Keeping horses,	447 00		
Advertising,	233 34		
Rosin,	3 00		
Freight on lumber,	66 00		
Royalty on hydrants,	60 00		
Drain pipe,	24 00		
Wood,	13 00		
Oil,	5 40		
Plugs,	69 70		
		$234,119 73	
ADD—			
Pipe used previously paid for,	$18,501 49		
New hydrants put in,	5,299 47		
New stop-cocks put in,	1,729 35		
Tools, materials and labor from shops,	1,296 18		
Replacing taps,	5 85		
Proportion of discount on bonds sold,	3,590 36		
	$30,422 70		
Amounts carried forward,	$30,422 70	$234,119 73	

		Cash Payment.	*True Cost.*
Amounts brought forward,.......	$30,422 70	$234,119 73	
DEDUCT—			
Labor and material for private parties,	2,870 60		
	27,552 10		
			$261,671 83
TWELFTH STREET WATER PIPE TUNNEL.			
Labor and construction,................	$3,918 20		
Bolts and iron work,..................	756 32		
Tools,........................	264 47		
Lumber,.............	141 32		
Oil and can,....................... ..	85 10		
Coal, ...	38 50		
Advertising,....	38 76		
Nails,................................	32 73		
Miscellaneous cash items,..............	14 12	5,289 52	5,289 52
TEMPORARY CONNECTION WITH TUNNEL.			
Use of engine,........................	$108 00		
Use of dredge, ...	1,202 50		
Cement,.............................	110 90	1,421 40	1,421 40
NEW ENGINE.			
G. W. Quintard, balance in full,........		1,212 16	1,212 16
NEW SOUTH WELL.			
R. E. Moss, balance of contract,.........	$15,375 84		
Bolts and lead,........................	904 65		
Labor, ...	106 62		
Advertising,..........................	34 88		
Coal, ...	94 24		
Lumber, ...	8 00	16,524 23	
ADD—			
Labor and material at shops,..........	$225 19		16,749 42
NEW INLET.			
Labor, ...	$2,185 03		
Use of dredge,........................	1,109 90		
Cement,............................	385 29		
Amounts carried forward,.	$3,680 22	$258,567 04	$286,344 33

		Cash Payment.	*True Cost.*
Amounts brought forward,........	$3,680 22	$258,567 04	$286,314 33
Lumber,..............................	87 07		
Brick, ...	234 00		
Castings,........	72 44		
Miners' lamps, ...	8 40		
Rubber clothing,......................	17 00		
Coal, ...	271 04		
		4,370 17	
ADD—			
Labor and material from shop,.........	$1,743 05		
			6,113 22
NEW TOWER.			
Extra labor and material,...............	$719 62		
Paid on account of per centage,..	280 00		
		999 62	
DEDUCT—			
Stone sold,......	$70 00		
			929 62
NEW SHOPS.			
Setting boilers,........................	$544 45		
Laying drain,.........................	177 83		
Balance for carpenter work,............	549 91		
Balance for painting and glazing, ...	137 00		
Masonry work,........................	49 56		
Labor, ...	65 80		
Lumber,..............................	16 50		
Plumbing,............................	222 15		
Gas fitting,......................	159 72		
		1,922 92	
ADD—			
Permanent tools, labor, gas, &c.,........	$3,639 75		
Proportion of discount on bonds sold,.	54 74		
	$3,694 49		5,617 41
NEW ENGINE HOUSE.			
A. Wallbaum, on account of contract,...	$18,500 00		
J. Clark & Bro.,“ “ “ “ ...	8,970 46		
W. W. Boyington, “ “ per centage,	1,200 00		
Gas fitting and fixtures,................	61 97		
Inspector, ...	407 00		
Labor,...............................	325 59		
		29,465 02	
Amounts carried forward,........		$295,324 77	$299,004 58

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$295,324 77	$299,004 58
ADD—			
Tearing down old building, cleaning bricks, &c.,......................	$2,004 32		
Resetting and refitting old boiler,......	3,400 71		
Proportion of discount on bonds sold,.	479 22		
	$5,884 25		
DEDUCT—			
Stone sold,...........................	$70 00		
	$5,814 25		35,279 27
LAKE TUNNEL EXTENSION.			
Labor,..............................	$1,025 37		
Boring rods, &c.,...........	146 51		
Rope,................................	15 92		
		1,187 80	1,187 80
Total addition to the Water Works,.......		$296,512 57	$335,471 65

WORKING EXPENSES AND REPAIRS.

EXPENSES AT PUMPING WORKS.

		Cash Payment.	*True Cost.*
Salary of engineer and three assistants, ..	$7,002 04		
Labor, ...	19,484 54		
6,548.$\frac{358}{2000}$ tons coal, (cash paid,)........	48,947 71		
Coal for steaming boilers,...............	274 46		
Coal for work shop,....................	952 10		
Castings, ...	9,328 26		
Oil, paint and brushes, ...	1,463 96		
Copper and brass,................	2,013 46		
Iron and steel,.........................	722 20		
Horse keeping,.................	411 69		
Hose and couplings,..................	228 35		
Packing, ...	237 67		
Hair felt,............................	257 86		
Repairs of boilers, etc.,.................	312 68		
Moving boilers,..........	204 85		
Grading lot,.........................	108 00		
Lead,....................	349 79		
One wagon,.........................	225 00		
One lathe,...........................	875 00		
Expenses to New York,................	116 60		
Gas, ...	720 92		
Belting,.................	204 97		
Tools,..........	597 72		
Gasket, ...	275 06		
Bolts, iron, nuts, etc., ...	396 41		
Stationery, ...	38 58		
Freight on waste,.....................	24 85		
Waste, ...	61 50		
Jacket lamps,....	3 00		
Drip pans and drainer,..................	27 00		
Ice, ...	18 45		
Gas burners, ...	6 00		
Painting,............................	50 00		
Amounts carried forward,........	$95,940 68		

			Cash Payment.	*True Cost.*
Amounts brought forward, ...		$95,940 68		
Furniture, ...		17 48		
Polish, ...		2 00		
Nails, ...		2 00		
Soap, ...		45 15		
Map of Chicago, ...		12 00		
Screw hinges, ...		12 18		
Harness and blankets, ...		54 00		
Miscellaneous cash items, ...		67 25		
			$96,152 74	
ADD—				
Coal used, previously paid for, ...		$1,151 15		
DEDUCT—				
Hydrants, stop cocks and labor used for and charged to extension repairs, and other water accounts, ...	$31,256 81			
Buggy, charged stock account,	225 00			
Labor on coal, charged coal account, ...	864 19			
Labor at shop, ...	230 52	32,576 52		
		$31,425 37		$64,727 37

LAKE TUNNEL.

			Cash Payment.	*True Cost.*
Use of tugs, ...		$1,477 25		
Lighthouse keeper, ...		907 50		
One fog bell, ...		506 30		
Labor, ...		415 32		
Carpenter work on crib, ...		1,205 19		
Oil, wicks and can, ...		226 50		
Iron and steel, ...		25 51		
Tools, ...		27 00		
Lumber, ...		94 75		
One signal halyard, ...		4 00		
Nails and spikes, ...		44 00		
Coal, ...		78 42		
Use of steam pump, ...		84 00		
Freight on steam pump, ...		50 00		
			5,145 74	
Amounts carried forward, ...			$101,298 48	$64,727 37

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$101,298 48	$64,727 37
ADD—			
Labor at shops,.......	$66 55		5,212 29
REPAIRS OF PIPES, HYDRANTS, STOP COCKS, AND MISCELLANEOUS OPERATING EXPENSES.			
Labor,...............	$19,433 26		
Hydrant inspectors,.....................	5,460 00		
Sidewalk, south reservoir,...............	207 46		
Curb wall on Adams street,..............	589 02		
Lumber.......	975 03		
Horse keeping,..........................	482 91		
Damages caused by leak,................	29 00		
Car fares,.........................	140 00		
Flushing hydrants,...	75 00		
Plumbing,...............................	122 64		
Tools,......................	78 44		
Coal,.	176 80		
Shutting off water,......................	108 00		
Use of carriage, ...	1 67		
Hardware,...............................	12 68		
Drayage,................................	22 00		
Oil,....................................	4 82		
Brick,....	55 00		
Cement,.................................	52 21		
Spikes, ...	40 00		
Letting on water,.......................	1 50		
Map of Chicago, ...	4 00		
Cost of judgment,.......................	50 10		
Police badges,..........................	9 34		
Waste,..................................	8 00		
Miscellaneous cash items,................	50		
Pipe used,...	200 00	28,339 38	
ADD—			
Hydrants used,........................	$2,377 69		
Stop cocks used,.	257 26		
Watching engine house, reservoirs and lots,...	796 00		
Labor and material from shop,.........	1,091 21		
Depreciation in meters,................	3,179 80		
	$7,701 96		
Amounts carried forward,........	$7,701 96	$129,637 86	$69,939 66

			Cash Payment.	*True Cost.*
Amounts brought forward,		$7,701 96	$129,637 86	$69,939 66
Deduct—				
Received for shutting off and letting on water,	$870 21			
Labor,	94 38			
Pipe sold,	48 12			
Vouchers canceled,	615 03	1,627 74		
		$6,074 22		
				34,413 60
WATER METERS.				
155 meters,		$10,973 25		
Freight on meters,		458 69		
Machinist,		1,200 00		
Meter connections, and labor on same,		1,052 30		
Valves, nipples, etc.,		996 59		
One horse,		175 00		
Lumber,		350 90		
Horse keeping,		203 10		
Lead,		47 19		
Tools,		71 36		
Pipe,		67 20		
Nails,		54 75		
Printing meter bills,		26 50		
Twelve dials,		15 00		
50 feet hose,		22 00		
Two buffalo robes,		20 00		
Castings,		19 05		
Drayage,		4 00		
Plumbing,		26 23		
Glazing,		5 50		
Sawdust,		10 00		
Miscellaneous cash items,		66 79		
			15,865 40	
Deduct—				
Valuation of meters, charged stock,		$10,465 00		
Received for setting meters, and 1 meter sold,		2,387 07		
		$12,852 07		
Amounts carried forward,		$12,852 07	$145,503 26	$104,353 26

		Cash Payment.	*True Cost.*
Amounts brought forward, ...	$12,852 07	$145,503 26	$104,353 26
ADD—			
Labor and material at shop,............	38 56		
	$12,813 51		3,051 89

OFFICE EXPENSES AND SALARIES.

Salaries of commissioners,................	$ 3,000 00		
Salaries of secretary and assistant,.......	1,399 96		
Salary of city engineer, ...	1,500 00		
Salary of bookkeeper and assistant,......	1,066 64		
Salaries of clerks,......................	4,183 44		
Salary of superintendent,.................	933 32		
Salary of assistant engineer,.............	600 00		
Salaries of draughtsmen,.............. .	2,813 44		
Salaries of messenger, janitor, & watchman,	764 00		
Water assessor and assistant,............	3,398 18		
Water collectors,........................	4,667 74		
Office rent,...........	2,250 00		
Stationery,........................... .	905 26		
Printing sixth annual report, ...	164 78		
Water rent books,.......................	135 00		
Advertising,............................	263 70		
Furniture,...........	216 30		
Printing,...............................	829 22		
Labor,...	555 43		
Coal,..............	225 37		
Revenue and postage stamps,....	146 12		
Cleaning office,........................	121 71		
Sprinkling in front of office,............	14 67		
Washing awnings,.......................	2 83		
Lumber, ...	40 52		
Painting and Glazing,...................	13 66		
Hardware, ...	83 73		
Inspector,..............................	50 00		
Ice,....................................	26 85		
Expense on bonds,.......................	60 00		
Plumbing,...............................	21 15		
Map of Chicago,.........................	20 00		
Drawing materials,......................	18 90		
Tools,........	2 00		
Gas fitting,.............................	3 75		
Gas, ...	92 66		
Miscellaneous cash items,................	97 55		
		30,688 48	
Amounts carried forward,........	$30,688 48	$176,191 74	$107,405 15

		Cash Payment.	*True Cost.*
Amounts brought forward,	$30,688 48	$176,191 74	$107,405 15
DEDUCT—			
Received from plumbers' licenses,	$69 75		
Amount deposited by comptroller,	91 00		
	$160 75		30,527 73
Total expenses and repairs,		$176,191 74	$137,932 88

WATER LOAN INTEREST.

			Cash Payment.	*True Cost.*
Interest on Water Loan bonds, July 1st, 1868, and January 1st, 1869,		$144,520 00		
Coupons paid by city treasurer,		27,460 00		
Commission to Duncan, Sherman & Co.		361 30		
Advertising,		11 96		
			$172,353 26	
ADD—				
Discount on 6 % Water Bonds,		$3,999 36		
DEDUCT—				
Accrued interest on bonds sold,	$4,391 00			
Over-remittance to D., S. & Co.,	200 00			
		4,591 00		
		$591 64		$171,761 62
Total Water Loan Interest,			$172,353 26	$171,761 62

MISCELLANEOUS EXPENSES.

SERVICE COCKS.

			Cash Payment.	*True Cost.*
Services of tappers,		$2,748 00		
Taps purchased,		5,767 40		
Tapping boxes,		2,063 75		
Permit clerk,		600 00		
Inspector,		912 00		
Horse keeping,		481 34		
Two horses purchased,		425 00		
Horse shoeing,		113 69		
Repairing wagons,		102 45		
Advertising,		182 84		
Rubber clothing,		20 25		
Blank books,		56 50		
Plumbing,		13 62		
Assistant permit clerk,		126 92		
Tools,		24 38		
Lumber,		92 70		
Printing,		64 50		
Repairing harness,		53 95		
Miscellaneous cash items,		5 05		
			$13,854 34	
ADD—				
Labor and material at shops,		$573 21		
Service cocks previously paid for,		1,040 71		
		$1,613 92		
DEDUCT—				
Two horses charged stock account,	$425 00			
Cash receipts for tapping,	14,221 57			
Service cocks sold,	450 95			
Inspecting,	31 00			
		15,128,52		
		$13,514 60		
Amounts carried forward,			$13,854 34	

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$13,854 34	
WATER WORKS STOCK.			
One buggy,..........	75 00		
One scale for pipe yard, ...	30 00		
		105 00	105 00
COAL ACCOUNT.			
Coal purchased and not used,............		2,472 41	
DEDUCT—			
Amount received from coal sold,.......	$339 00		2,133 41
WATER PIPE ACCOUNT.			
Pipe purchased and not used,............		27,687 60	
ADD—			
Pipe previously paid for,..............	3,305 31		
Pipe used and not yet paid for, ...	2,871 05		
	$6,176 36		33,863 96
INCOME.			
Tax overpaid refunded,................		109 90	109 90
VAN BUREN STREET SERVICE PIPE.			
M. Greenebaum, laying pipe,............		554 80	
ADD—			
32 taps used,.........................	115 20		670 00
CLARK STREET SERVICE PIPE.			
J. Hogan, laying pipe,.................		1,301 56	
ADD—			
74 taps used,.....	266 40		1,567 96
HALSTED STREET SERVICE PIPE.			
A. W. Raffin, laying pipe,..............		1,593 06	1,593 06
BLUE ISLAND AVENUE SERVICE PIPE.			
A. W. Raffin, laying pipe, ...		780 11	780 11
Amounts carried forward,........		$48,458 78	$40,823 40

	Cash Payment.	*True Cost.*
Amounts brought forward,.......	$48,458 78	$40,823 40
STATE STREET SERVICE PIPE.		
A. W. Raffin, laying pipe,................	600 77	600 77
ADAMS' STREET SERVICE PIPE.		
Bassett & Patterson, laying pipe,..........	221 04	221 04
MICHIGAN STREET SERVICE PIPE.		
J. Schuster, laying pipe, ...	757 55	757 55
WASHINGTON STREET SERVICE PIPE.		
Jos. Hogan, laying pipe, ...	127 60	127 60
TWENTY-SECOND STREET SERVICE PIPE.		
J. Hogan, laying pipe, ...	434 30	434 30
ADAMS STREET SERVICE PIPE.		
J. Scanlan, laying pipe,..............	836 94	836 94
HARMON COURT SERVICE PIPE.		
Jos. Hogan, laying pipe,..................	163 22	163 22
TWELFTH STREET SERVICE PIPE.		
Jos. Hogan, laying pipe,..................	115 60	115 60
PRAIRIE AVENUE SERVICE PIPE.		
Jos. Hogan, laying pipe,..................	141 38	141 38
Total miscellaneous expenses,............	51,857 18	44,221 80
Total addition to the Water Works, brought forward,....	296,512 57	335,571 65
Water Works expense and repairs, brought forward,.............................	176,191 74	137,932 88
Water loan interest, brought forward,.....	172,353 26	171,761 62
	$696,914 75	$689,397 95

Total cash expenditures,............	$696,914 75
Balance due city treasurer, April 1st, '69,	12,390 49
	$684,524 26
Total receipts for the year, including balance of April 1st, 1868,........	$684,524 26

SEWERAGE DEPARTMENT.

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WOKS, MARCH 31st, 1869.

	Dr.	*Cr.*
Sewers, North Division,	$459,504 44	
Sewers, South Division,	594,281 44	
Sewers, West Division,	905,896 15	
A. H. Sellers,		$610 50
A. E. Kent,		259 00
T. W. Phinney,		320 05
S. S. Hayes,		1,069 50
James W. Borden,		1,831 20
William Giles,		381 72
Sewerage Brick,	8,577 75	
Charles Messenger,		339 87
E. T. Bowen,		118 98
J. C. Bigelow,		354 10
Healey slough improvement,	72 14	
Sylvester Lynd, treasurer sewerage commissioners,	109,245 48	
Sewerage loan bonds, 6 %,		87,000 00
Sewerage loan bonds, 7 %,		1,753,000 00
Sewerage loan bonds canceled,		160,000 00
Sewerage sinking fund,		98,515 81
Sewerage sinking fund mortgages,	5,922 10	
Discount on sewerage loan bonds,	19,266 71	
Sewerage loan interest account,		14,478 64
Busch & Brand,		626 37
Sewerage pipe,	9,258 66	
Sewerage stock,	3,677 90	
American Exchange National Bank,	3,135 00	
House Drains,		3,189 03
Dennis Coughlin,	1,561 51	
Amounts carried forward,	$2,120,399 28	$2,122,094 77

	Dr.	*Cr.*
Amounts brought forward,	$2,120,399 28	$2,122,094 77
Michigan street drains,	471 80	
West Van Buren street drains,	792 04	
North Clark street drains,	2,205 17	
Galena and Chicago Union R. R. Co.,		382 55
Sewerage fund due city treasurer,		68,126 21
E. ½ lot 3, block 4, Kinzie's addition,	68 50	
S. ½ lot 5, block 123, school section addition,	22 18	
Z. Cobb, agent, S. 80 feet, W. ½ lot 7, B. 36, O. T.,	31 53	
Pittsburgh and Ft. Wayne R. R. Co.,		616 84
Chicago, Burlington and Quincy R. R. Co.,		6,744 01
Owners of lots 1, 2, 7 and 8, B. 5, J. R. & S. add.,	94 54	
Cement account,	157 86	
North State street drains,	331 76	
West Adams street drains,	256 00	
Sewerage sinking fund in hands of the treasurer,	32,938 47	
Sewerage man hole and catch basin covers,	3,935 00	
Sewerage expense and repairs,	16,036 19	
West Madison street drains,	110 66	
South Wells street drains,	405 96	
Washington street drains,	8 05	
La Salle street drains,	456 32	
Ezra B. Lincoln,		346 60
Thomas Wilce,		1,469 00
Charles Busby,		838 20
David R. Dyche,		243 92
Griswold and Sherman streets drains,	541 50	
Filling north Market street,	1,205 70	
Filling Harrison, Polk and Taylor streets,	312 80	
Michigan avenue drains,	4,500 99	
Chicago avenue drains,	350 60	
Milwaukee avenue drains,	1,494 74	
Market street drains,	826 61	
Halsted street drains,	1,333 00	
Clark street drains,	1,921 57	
Indiana avenue drains,	2,389 80	
Kinzie street drains,	609 00	
Archer avenue drains,	563 22	
Sangamon street drains,	511 28	
Blue Island avenue drains,	712 00	
Franklin street drains,	232 40	
Huron street drains,	70 68	
Harmon court drains,	104 50	
Adams street drains,	394 00	
Amounts carried forward,	$2,196,795 70	$2,200,862 10

	Dr.	*Cr.*
Amounts brought forward,	$2,196,795 70	$2,200,862 10
Monroe street drains,	652 16	
John Duffy, contractor,		2,899 60
Ohio street drains,	551 38	
Prairie avenue drains,	143 10	
Twenty-second street drains,	343 36	
Desplaines street drains,	788 90	
Pine street drains,	196 84	
Canal street drains,	629 42	
Clinton street drains,	410 82	
North Dearborn street drains,	1,937 31	
Twelfth street drains,	111 15	
West Lake street drains,	1,201 56	
	$2,203,761 70	$2,203,761 70

SEWERAGE FUND.

Statement of the cash receipts by the Board of Public Works, from April 1st, 1868, to March 31st, 1869, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time.

RECEIPTS.

Proceeds of 141 seven per cent. bonds sold, including interest,	$140,109 89	
Received from city account of sewerage tax, 1868,	252,405 74	
Temporary loan,	30,000 00	
Pipe sold,	716 35	
House drain permits issued,	11,208 10	
Sundry persons for constructing sewers,	1,541 27	
Constructing drains,	420 92	
Re-laying drains,	77 80	
Covers sold,	127 00	
Brick sold,	8 40	
Cement sold,	5 62	
Freight on lumber refunded,	22 00	
Received for cleaning sewers,	35 00	
Received for repairs of sewers,	160 96	
Labor,	359 87	
Material sold,	17 50	
Received for drain layers' licenses,	22 00	
	$437,238 42	
Balance due city treasurer, April 1st, 1869,	68,126 21	
		$505,364 63

EXPENDITURES.

SEWERS, NORTH DIVISION.

		Cash Payment.	*True Cost.*
Services of engineers,	$ 1,769 96		
Inspectors and rod men,	1,081 75		
Labor,	7,709 33		
Amounts carried forward,	$10,561 04		

			Cash Payment.	*True Cost.*
Amounts brought forward,		$10,561 04		
Cement used,		1,211 59		
Filling north Market street,		516 00		
Tools,		16 59		
Horse keeping,		92 55		
Car fares,		50 44		
Lumber,		78 60		
Oil,		8 85		
Blacksmith work,		27 67		
Blank books,		10 00		
Plumbing,		28 17		
Water used,		4 57		
			12,606 07	
ADD—				
Filling N. Dearborn street,	$ 72 00			
Depreciation in tools,	180 22			
Pipe used,	2,980 28			
Brick used,	2,006 29			
Covers used,	860 00			
Proportion of dis. on bonds,	932 16			
Expense sewer, Larrabee st.,	9,034 95			
“ “ Wells st.,	10,650 21			
“ “ Chestnut st.,	1,097 48			
“ “ Carl st.,	2,001 27			
“ “ Grant st.,	1,501 18			
“ “ North ave.,	1,869 40			
“ “ Wash. pl.,	868 76			
“ “ Division st.,	2,479 94			
“ “ Oak st.,	85 50			
“ “ Schiller st.,	199 00			
“ “ Goethe st.,	205 00			
“ “ Granger st.,	95 00			
“ “ Sigel st.,	95 00			
DEDUCT—		37,213 64		$49,747 71
Amount received for filling N. Dearborn st.,		72 00		
		$37,141 64		
SEWERS, SOUTH DIVISION.				
Services of engineers,		$ 2,664 97		
Inspectors and rod men,		1,365 50		
Amounts carried forward		$4,030 47	$12,606 07	$49,747 71

			Caah Payment.	*True Cost.*
Amounts brought forward,		$4,030 47	$12,606 07	$49,747 71
Labor,		10,936 14		
Cement used,		1,590 61		
Constructing sewer on Calumet avenue,		1,353 50		
Constructing sewer on 25th street,		162 50		
Lumber,		203 81		
Car fares,		95 39		
Horse keeping,		92 55		
Paving,		10 00		
Tools,		14 53		
Rent of stable,		31 26		
Plumbing,		13 11		
Repairing tools,		6 56		
Oil,		8 85		
Blacksmith work,		27 66		
One tap broken,		2 50		
Field book,		10 00		
Water used,		4 58		
			18,594 02	
ADD—				
Depreciation in tools,	$ 180 23			
Pipe used,	2,435 38			
Brick used,	3,117 47			
Covers used,	1,220 00			
Proportion of disc. on bonds,	802 44			
Sewer on 18th street,	838 20			
Expense sewer, S. Halsted st.,	5,679 51			
“ “ Eighteenth st.	3,349 36			
“ “ Wabash ave.,	5,910 48			
“ “ Calumet ave.,	343 57			
“ “ Prairie ave.,	19 00			
“ “ Wentw'rth av	28 50			
“ “ Purple st.,	23 75			
		23,947 89		
DEDUCT—				
Amount rec'd for labor and material,		145 90		
		$23,801 99		
				42,396 01

SEWERS, WEST DIVISION.

Services as engineers,		$ 1,900 07		
Inspectors and rod men,		1,883 50		
Amounts carriad forward,		$3,783 57	$31,200 09	$92,143 72

			Cash Payment.	*True Cost.*
Amounts brought forward,.......		$ 3,783 57	$31,200 09	$92,143 72
Labor,............................		16,388 34		
Construction of sewers,................		1,641 75		
Filling on Fourth street,....		299 48		
Cement,................................		2,727 62		
Filling on Jefferson street,.............		34 50		
Filling on Polk street,..................		66 00		
Tools,.................................		12 29		
Car fares,............................		59 01		
Repairing tools,.......................		6 56		
Horse keeping,...................... ..		113 91		
Lumber, ...		219 26		
Oil,...................................		8 85		
Oil clothing, etc.,......................		12 00		
Blacksmith work,.......................		32 67		
Plumbing,.............................		63 58		
Field Book,............................		10 00		
Water used,...........................		4 58		
			25,483 97	
ADD—				
Depreciation in tools,.......	$ 180 22			
Pipe used,.................	5,521 67			
Brick used,.................	5,270 67			
Covers used,...............	1,789 00			
Construction of sewers for private parties,...........	6,184 89			
Proportion of disc. on bonds,	1,988 10			
Expense sewer, Halsted st.,..	18,035 53			
" " Chicago ave.,	11,708 74			
" " Erie st.,.....	7,639 17			
" " Canal st.,....	5,977 02			
" " Desplaines st.	1,530 99			
" " Ann st.,.....	1,246 32			
" " Ada st.,.....	1,369 28			
" " Lake st.,.....	7,644 60			
" " Reuben st.,..	38 00			
" " Morgan st.,..	23 75			
" " Rucker st.,...	19 00			
" " Sangamon st.,	402 55			
" " Eighteenth st.	3,347 45			
		79,916 95		
Amounts carried forward,........		$79,916 95	$56,684 06	$92,143 72

		Cash Payment.	True Cost.
Amounts brought forward,	$79,916 95	$56,684 06	$92,143 72
DEDUCT—			
Amount received for labor,	391 72		
	$79,525 23		105,009 20
			197,152 92
CLEANSING SEWERS, NORTH DIVISION.			
Labor,	$ 6,862 69		
Repairs of wagons and tools,	107 71		
Water used for flushing,	42 09		
Blacksmith work,	30 75		
Oil,	5 59		
Tools,	5 48		
One pair of boots,	2 66		
Salt,	86		
		7,057 83	
ADD—			
Depreciation in tools,	180 22		
DEDUCT—			
Amount received for labor,	10 00		7,228 05
	$170 22		
CLEANSING SEWERS, SOUTH DIVISION.			
Labor,	$10,783 24		
Repairing wagons and tools,	107 71		
Blacksmith work,	30 75		
Water used for flushing,	42 09		
Tools,	17 88		
Oil,	5 60		
Rubber boots,	9 17		
Salt,	87		
		10,997 31	
ADD—			
Depreciation in tools,	180 23		
DEDUCT—			
Amount received for labor,	40 00		
	$140 23		11,137 54
Amounts carried forward,		$74,739 20	$215,518 51

			Cash Payment.	*True Cost.*
Amounts brought forward,			$74,739 20	$215,518 51
CLEANSING SEWERS, WEST DIVISION				
Labor,		$8,199 56		
Repairing wagons and tools,		107 72		
Water used in flushing,		42 09		
Blacksmith work,		30 75		
Oil,		19 11		
Tools,		5 48		
Rubber boots,		2 67		
Salt,		87		
			8,408 25	
ADD—				
Depreciation in tools,		180 22		8,588 47
REPAIRS OF SEWERS, NORTH DIVISION.				
Labor,		$3,034 83		
Cement,		316 62		
Repairing tools and wagon,		13 57		
Blacksmith work,		4 10		
			3,369 12	
ADD—				
Depreciation in tools,	$90 11			
Brick used,	342 22			
Covers used,	300 14	732 47		
DEDUCT—				
Cement sold,		2 25		
		730 22		4,099 34
REPAIRS OF SEWERS, SOUTH DIVISION.				
Labor,		$2,203 56		
Cement,		226 06		
Repairing wagon and tools,		13 56		
Blacksmith work		4 10		
			2,447 28	
ADD—				
Depreciation in tools,	$ 90 11			
Brick used,	355 27			
Covers used,	492 42			
		937 80		
Amounts carried forward,		$ 937 80	$88,963 85	$228,206 32

			Cash Payment.	*True Cost.*
Amounts brought forward,		$ 937 80	$88,963 85	$228,206 32
DEDUCT—				
Amount received for damages,		10 00		
		927 80		
				3,375 08
REPAIRS OF SEWERS, WEST DIVISION.				
Labor,		$2,808 63		
Cement,		225 97		
Repairing wagon and tools,		13 56		
Oakum,		7 00		
Blacksmith work,		4 10		
			3,059 26	
ADD—				
Depreciation in tools,	$ 90 11			
Brick used,	197 07			
Covers used,	466 22			
		753 40		
				3,812 66
MAN HOLE AND CATCH BASIN COVERS.				
Lumber,		$2,915 96		
Labor,		2,463 40		
Nails and Spikes,		456 02		
Freight on lumber,		625 34		
Tar used,		112 00		
Tools,		11 00		
			6,583 72	
DEDUCT—				
Covers used for sewers and repairs,	$6,578 78			
Covers sold,	127 00			
Freight on lumber refunded,	22 00			
		6,727 78		
HOUSE DRAINS.				
Services of draughtsmen,		$1,200 00		
Inspecting,		3,918 40		
Permit Clerk,		900 00		
Amounts carried forward,		$6,018 40	$98,606 83	$235,394 06

		Cash Payment.	*True Cost.*
Amounts brought forward,........	$6,018 40	$98,606 83	$235,394 06
Advertising,...........................	364 52		
Stationery and blank books,.............	200 00		
Labor,..................................	248 50		
Relaying drains,........................	269 87		
Repairing drains,.......................	25 15		
Car fares,..............................	164 65		
Printing,...............................	31 50		
Cement,.................................	75 34		
Miscellaneous,..........................	43 65		
Tools,..................................	6 00		
		7,447 58	
DEDUCT—			
Received for permits issued,..........	$11,208 10		
" " labor,.................	106 25		
" " cement,................	3 37		
	$11,317 72		
ADD—			
Pipe junctions used,..................	1,635 39		
Net profits in cash,....................	$9,682 33		
OFFICE EXPENSES AND SALARIES.			
Salaries of Commissioners,..............	$3,000 00		
Salary of Secretary and assistant,......	1,399 96		
Salary of City Engineer,................	1,500 00		
Salary of Superintendent,...............	933 32		
Salary of Clerks,.......................	4,680 84		
Salary of messenger, watchman & janitor,	762 00		
Salary of draughtsman,..................	1,216 32		
Rent of office,.........................	2,250 00		
Furniture,..............................	215 81		
Stationery,.............................	466 37		
Labor,..................................	478 35		
Printing sixth annual report,...........	164 78		
Lumber,.................................	33 52		
Ice,....................................	26 85		
Painting and glazing,...................	13 66		
Plastering water office,................	8 33		
Sprinkling in front of office,..........	14 67		
Coal,...................................	198 32		
Police badges,..........................	7 33		
Gas fixtures and fitting,...............	10 40		
Amounts carried forward,........	$17,380 83	$106,054 41	$235,394 06

		Cash Payment.	*True Cost.*
Amounts brought forward,........	$17,380 83	$106,054 41	$235,394 06
Keeping horse,........................	133 25		
Advertising,............................	38 76		
Plumbing, ...	14 86		
Blank books,...........................	26 67		
Toweling, ...	6 67		
Hardware, ...	71 23		
Printing,................................	53 92		
Negotiating loan,......................	75 00		
Washing towels and awnings, ...	22 84		
Maps of Chicago, ...	52 00		
Cleaning office,.........................	113 55		
Revenue stamps, ...	133 32		
Gas, ...	83 32		
Miscellaneous cash items, ...	89 33		
Temporary loan,.........................	30,000 00		
		48,295 55	
DEDUCT—			
Amount received for temporary loan,..	$30,000 00		
" " " drain layers license	22 00		
	$30,022 00		
			18,273 55

SEWERAGE INTEREST.

Interest on sewerage loan bonds, July 1st, 1868, and January 1st, 1869,..........	$127,510 00		
Interest on temporary loan,.............	933 33		
Commissions to American Exchange Nat. Bank,..............................	318 77		
Coupons paid by City Treasurer,........	420 00	129,182 10	
DEDUCT—			
Accrued interest on bonds sold,.........	2,832 59		
			126,349 51

SEWERAGE STOCK.

Tools, ...	$249 75		
Sheeting,................................	792 05		
Buggy,..............................	75 00		
Freight on sheeting,.....................	50 40		
Pipe couplings,.........................	24 05		
Labor, ...	18 00		
		1,209 25	
DEDUCT—			
Sheeting sold,........................	$462 10		747 15
Amounts carried forward,..................		$284,741 31	$380,764 27

		Cash Payment.	*True Cost.*
Amounts brought forward,		$284,741 31	$380,764 27
SEWERAGE PIPE.			
Pipe purchased,	$19,844 65		
Labor,	907 00		
Freight,	365 62		
Advertising,	58 09		
		21,175 36	
DEDUCT—			
Pipe charged sewers and repairs,	$14,975 78		
" " house drains,	1,635 39		
Pipe sold,	716 35		
	$17,327 52		
SEWERAGE BRICK.			
Brick purchased,	$37,631 82		
Labor,	1,052 86		
Advertising,	147 25		
		38,831,93	
DEDUCT—			
Brick charged sundry sewers,	$36,745 78		
Brick sold,	8 40		
	$36,754 18		
			2,077 75
LARRABEE STREET SEWER.			
McHugh & Kelly, constructing sewer,	$5,202 75		
Labor,	119 00		
Plumbing,	158 41		
		5,480 16	
NORTH WELLS STREET SEWER.			
McHugh & Kelly, constructing sewer,	$8,579 35		
Labor,	183 88		
		8,763 23	
CHESTNUT STREET SEWER.			
McHugh & Kelly, constructing sewer,	$812 25		
Labor,	11 50		
		823 75	
Amounts carried forward,		$359,815 74	$382,842 02

		Cash Payment.	*True Cost.*
Amounts brought forward,		$359,815 74	$382,842 02
CARL STREET SEWER.			
McHugh & Kelly, constructing sewer,	$1,672 44		
Labor,	18 00		
		1,690 44	
GRANT STREET SEWER.			
McHugh & Kelly, constructing sewer,	$1,162 57		
Labor,	72 50		
		1,235 07	
NORTH AVENUE SEWER.			
McHugh & Kelly, constructing sewer,	$1,518 88		
Labor,	72 75		
		1,591 63	
WASHINGTON PLACE SEWER.			
McHugh & Kelly, constructing sewer,	$630 00		
Labor,	6 75		
		636 75	
DIVISION STREET SEWER.			
Bartley Langan, constructing sewer,	$2,364 50		
Labor,	34 50		
Plumbing,	80 94		
		2,479 94	
OAK STREET SEWER.			
Labor,		85 50	
SCHILLER STREET SEWER.			
McHugh & Kelly, constructing sewer,		199 00	
GOETHE STREET SEWER.			
McHugh & Kelly, constructing sewer,		205 00	
Amounts carried forward,		$367,939 07	$382,842 02

		Cash Payment.	*True Cost.*
Amounts brought forward,		$367,939 07	$382,842 02

GRANGER STREET SEWER.

McHugh & Kelly, constructing sewer,		95 00	

SIGEL STREET SEWER.

McHugh & Kelly, constructing sewer,		95 00	

SOUTH HALSTED STREET SEWER.

B. Langan, constructing sewer,	$3,248 00		
B. Langan, extras,	116 87		
Labor,	96 25		
Plumbing,	32 39		
		3,493 51	

EIGHTEENTH STREET SEWER.

B. Langan, constructing sewer,	$1,600 94		
Labor,	406 92		
Cement,	100 00		
		2,107 86	

WABASH AVENUE SEWER.

B. Langan, constructing sewer,	$4,449 66		
B. Langan, extras,	153 00		
Labor,	47 50		
		4,650 16	

CALUMET AVENUE SEWER.

Labor,		30 25	

PRAIRIE AVENUE SEWER.

Labor,		19 00	

WENTWORTH AVENUE SEWER.

Labor,		28 50	

PURPLE STREET SEWER.

Labor,		23 75	
Amounts carried forward,		$378,482 10	$382,842 02

		Cash Payment.	True Cost.
Amounts brought forward,		$378,482 10	$382,842 02
HALSTED STREET SEWER.			
John Duffy, constructing sewer,	$9,391 54		
Woodruff & Kaffin, constructing sewer,	429 00		
" " extras,	11 25		
Plumbing,	276 00		
Cement,	23 65		
Labor,	815 63		
		10,947 07	
CHICAGO AVENUE SEWER.			
John Duffy, constructing sewer,	$6,026 43		
Labor,	329 00		
		6,355 43	
ERIE STREET SEWER.			
John Duffy, constructing sewer,	$3,737 50		
Labor,	377 25		
		4,114 75	
CANAL STREET SEWER.			
John Duffy, constructing sewer,	$3,434 35		
Labor,	114 25		
		3,548 60	
DESPLAINES STREET SEWER.			
John Duffy, constructing sewer,	$968 10		
Labor,	61 00		
		1,029 10	
ANN STREET SEWER.			
John Duffy, constructing sewer,	$927 24		
Labor,	14 63		
		941 87	
ADA STREET SEWER.			
John Duffy, constructing sewer,	$1,034 31		
Labor,	14 62		
		1,048 93	
Amounts carried forward,		$406,467 85	$382,842 02

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$406,467 85	$382,812 02
LAKE STREET SEWER.			
John Duffy, constructing sewer,........	$4,326 26		
Labor,..............................	215 62		
		4,541 88	
REUBEN STREET SEWER.			
Labor,...		38 00	
MORGAN STREET SEWER.			
Labor, ...		23 75	
RUCKER STREET SEWER.			
Labor,..............................		19 00	
SANGAMON STREET SEWER.			
John Duffy, constructing sewer,........		402 55	
WEST EIGHTEENTH STREET SEWER.			
Brick,..............................	$1,200 00		
Labor, ...	1,942 37		
Cement,..............................	205 08		
		3,347 45	
MICHIGAN STREET DRAINS.			
John Duffy, constructing drains,		478 80	
DEDUCT—			
Refunded on account of drain,........	$7 00		
			471 80
WEST VAN BUREN STREET DRAINS.			
O'Brien & Flanerdy, constructing drains,		987 92	
DEDUCT—			
Refunded on account of drain,........	$195 88		
			792 04
Amounts carried forward,..		$416,307 20	$384,105 86

		Cash Payment.	*True Cost.*
Amounts brought forward,................		$416,307 20	$384,105 86
NORTH CLARK STREET DRAINS.			
Chas. Berkenshaw, constructing drains,..		2,205 17	2,205 17
NORTH STATE STREET DRAINS.			
B. Langan, constructing drains,..........		331 76	331 76
WEST ADAMS STREET DRAINS.			
Woodruff & Raffin, constructing drains,..		256 00	256 00
HALSTED STREET DRAINS.			
Chas. Berkenshaw, constructing drains,..		799 50	799 50
ARCHER AVENUE DRAINS.			
John Duffy, constructing drains,.........		563 22	563 22
SANGAMON STREET DRAINS.			
J. McHugh, constructing drains, ...		574 64	
DEDUCT—			
Refunded on account of drains,.......	$63 36		511 28
BLUE ISLAND AVENUE DRAINS.			
Chas. Birkenshaw, constructing drains,.		712 00	712 00
FRANKLIN STREET DRAINS.			
B. O'Neil, constructing drains, ...		232 40	232 40
HURON STREET DRAINS.			
B. O'Neil, constructing drains, ...		70 68	70 68
HARMON COURT DRAINS.			
John P. Dickey, constructing drains, ...		104 50	104 50
ADAMS STREET DRAINS.			
Chas. Birkenshaw, constructing drains,..		394 00	394 00
MONROE STREET DRAINS.			
M. Mulany, constructing drains,...		652 16	652 16
Amounts carried forward,........		$423,203 23	$390,938 53

		Cash Payment.	*True Cost.*
Amounts brought forward,................		$423,203 23	$390,938 53
OHIO STREET DRAINS.			
B. O'Neil, constructing drains, ...		551 38	551 38
NORTH WELLS STREET DRAINS.			
J. P. Dickey, constructing drains, ...		207 00	207 00
PRAIRIE AVENUE DRAINS.			
Chas. Birkenshaw, constructing drains,..		143 10	143 10
TWENTY-SECOND STREET DRAINS.			
Chas. Birkenshaw, constructing drains,..		343 36	343 36
DESPLAINES STREET DRAINS.			
M. Mulany, constructing drains,.........		788 90	788 90
PINE STREET DRAINS.			
B. O'Neil, constructing drains,...		196 84	196 84
MICHIGAN AVENUE DRAINS.			
M. Magann, constructing drains, ...		1,323 49	1,323 49
CANAL STREET DRAINS.			
M. Mulany, constructing drains,.........		629 42	629 42
CLINTON STREET DRAINS.			
M. Mulany, constructing drains,.........		410 82	410 82
NORTH DEARBORN STREET DRAINS.			
Chas. Birkenshaw, constructing drains,..	$1,910 48		
E. McGrath, constructing drains,........	88 11		
		1,998 59	
DEDUCT—			
Refunded on account of drain,........	$61 28		
			1,937 31
INDIANA AVENUE DRAINS.			
M. Magann, constructing drains, ...		713 00	713 00
Amounts carried forward,.........		$430,509 13	$398,183 15

	Cash Payment.	*True Cost.*
Amounts brought forward,........	$430,509 13	$398,183 15
TWELFTH STREET DRAINS.		
M. Mulany, constructing drains,.........	111 15	111 15
WEST LAKE STREET DRAINS.		
Wm. Woodruff, constructing drains, ...	1,201 56	1,201 56
TRUSTEES CHICAGO THEOLOGICAL SEMINARY.		
Paid them amount advanced for sewer in 1866,...........	1,200 00	
SEWERAGE SINKING FUND MORTGAGES.		
Examining titles,.....................	55 00	55 00
SINKING FUND.		
Amount paid sinking fund for its proportion of sewerage tax for 1867,.........	35,869 39	35,869 39
Total cash expenditures,..........	$468,946 23	$435,420 25

SEWERAGE SINKING FUND.

RECEIPTS

Proportion of sewerage tax for 1867,.....	$28,878 82	
Balance in hands of City Treasurer, April 1st, 1868,........................	4,114 65	
		$32,993 47

EXPENDITURES.

Paid Chase Bros. for examining title,.....	55 00	
Balance in hands of City Treasurer, April 1st, 1869,........................	32,938 47	
		$32,993 47

River Improvement Department.

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WORKS, MARCH 31st, 1869.

	Dr.	*Cr.*
River Improvement Fund (due City Treasurer)....		$ 29,223 52
Expenses of Survey previous to adoption of plan..	$ 1,269 23	
Walter Kimball, Comptroller....................	13,000 00	
American Exchange National Bank...............	945 00	
Expenses of Illinois and Michigan Canal Survey...	23,166 64	
River Improvement Salary Account..............	24,750 00	
River Improvement Office Expense........	1,582 16	
River Improvement Sinking Fund................		3,883 65
River Improvement Bonds, 7 %		1,000,000 00
Discount on River Improvement Bonds...........	31,259 12	
River Improvement Loan Interest...............	65,104 86	
River Improvement Miscellaneous Expense........	58,078 39	
C. B. Kimball & Co., Contractors.................	57,130 63	
Sanger, Steel & Co., Contractors..................	62,292 59	
Fox, Howard & Walker, Contractors..............	98,649 95	
Fox, Howard & Walker, 2d contract	197,458 33	
Hosch & Harroon, Contractors...	21,598 50	
C. E. Boyer, Contractor...........................	177,764 76	
Hosch & Van Slyck, Contractors.................	39,750 25	
S. W. Norton, Contractor.........................	52,608 98	
Lee & Graham, Contractors..................	23,370 75	
J. A. Hendricks & Co., Contractors...............	38,099 92	
Fox, Howard & Walker, Contractors, sec. 42, 43 & 44	18,109 13	
Fox, Howard & Walker, Contractors, sec. 20 to 26 inc.	7,186 75	
Carkin & Kimball, Contractors................ ..	8,978 13	
Hugh Maher, Contractor..........................	1,518 10	
Barnard & Gowen, Contractors....................	9,435 00	
	$1,033,107 17	$1033,107 17

RIVER IMPROVEMENT FUND.

STATEMENT of the Cash Receipts by the Board of Public Works from April 1st, 1868, to March 31st, 1869, inclusive, and detailed statement of the cost of the various operations conducted by the Board during the same time:

RECEIPTS.

Proceeds sale of 537 River Improvement Bonds, including accrued interest,	$534,671 74	
Repairs on Boat refunded	14 75	
		$534,686 49

EXPENDITURES.

		Cash Payment.	True Cost.
OFFICE EXPENSES AND SALARIES.			
Salaries of Commissioners,	$6,000 00		
Rent of Office,	90 00		
Matches, Oil, etc.,	1 98		
		$6,091 98	$6,091 98
INTEREST.			
Amount of Coupons due July 1st, 1868, and January 1st, 1869,	$47,075 00		
Coupons paid by W. F. Wentworth, City Treasurer,	735 00		
Interest on advance on Bonds,	66 54		
Error in accrued interest on Bonds sold J. P. Brooks,	1,408 00		
Commissions to American Exchange National Bank,	117 61		
		49,402 15	49,402 15
Amounts carried forward,		$55,494 13	$55,494 13

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$55,494 13	$55,494 13
EXPENSES OF SURVEY.			
Engineers,..............................	$3,100 00		
Rodmen,..................................	1,527 67		
Making profile and maps, ...	115 50		
Throwing up banks to protect canal,....	612 50		
Rope,....................................	1 80	5.357 47	
DEDUCT—			
Amount refunded for repairs of boat,...	14 75		5,342 72
MISCELLANEOUS.			
C. B. Kimball & Co., on acc't of contract,	$32,480 63		
Fox, Howard & Walker, " "	153,125 30		
Hosch & Harroon, " "	20,429 75		
C. E. Boyer, " "	103,049 76		
Hosch & Van Slyck, " "	24,722 25		
S. W Norton, " "	36,339 20		
Lee & Graham, " "	13,744 50		
J. A. Hendricks & Co., " "	20,798 17		
Fox, Howard & Walker, " "	18,109 13		
Fox, Howard & Walker, " "	7,186 75		
Carkin & Kimball, " "	8,978 13		
Hugh Maher, " "	1,518 10		
Barnard & Gowen, " "	9,435 00		
Advertising,..........................	700 18		
Pumping at Bridgeport,.................	15,973 83		
Use of dredge,.........................	4,800 00		
Legal services in Sanger, Steel & Co.'s case,	3,500 00		
Reporting in do., ...	465 00		
Express on bonds and coupons,..........	260 50		
Telegrams, ...	38 95		
J. M. Wilson, services as referee,.........	250 00		
Watching feeder,................... ..	115 00		
Engraving 500 bonds,...................	129 25		
Five acres of land,.....................	200 00		
Lamps, wicks, etc.,....................	67		
Examining pumps at Lemont, ...	3 50		
Throwing up protection ditches, ...	67 00		
Labor on coupons,.............	8 00		
Printing,................................	20 00		
Section map,...........................	2 00		
Miscellaneous items paid by engineer,....	99 39	476,549 94	476,549 94
Total cash expenditures,....		$537,401 54	$537,386 79

CITY HALL FUND.

Trial Balance, Ledger, Board of Public Works, March 31st, 1869.

	Dr.	*Cr.*
City Hall Fund in hands of treasurer,..	$36,708 14	
City Hall Bonds,......................		$60,000 00
N. P. Loberg, contractor,..............	5,000 00	
Rose & Chapman, architects,...........	2,000 00	
City Hall miscellaneous expense,.......	9,587 60	
Discount on City Hall Bonds,..........	1,704 26	
L. W. Boldenweck,.....................	5,000 00	
	$60,000 00	$60,000 00

CITY HALL FUND.

STATEMENT showing the cash receipts and detailed account of work done under the charge of the Board of Public Works during the year ending March 31st, 1869.

RECEIPTS.

Proceeds of 60 municipal bonds,.........	$58,295 74

EXPENDITURES.

		Cash Payment.	True Cost.
N. P. LOBERG.			
Paid him on account of contract,........		$5,000 00	$5,000 00
ROSE & CHAPMAN, ARCHITECTS.			
Paid them on account,............... ..		2,000 00	2,000 00
L. W. BOLDENWICK.			
Paid him on account of contract, ...		5,000 00	5,000 00
MISCELLANEOUS EXPENDITURES.			
F. Letz, on acc't of contract for iron work,	$9,261 60		
Advertising for proposals,...............	46 50		
Express charges,..................... ..	20 00		
Labor, ...	246 00		
Cement,..............................	13 50		
		9,587 60	9,587 60
Total cash expenditures,..........		$21,587 60	$21,587 60
Balance in hands of treasurer, April 1st, 1869,		36,708 14	
		$58,295 74	

CITY BRIDEWELL FUND,

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WORKS, MARCH 31ST, 1869.

	Dr.	*Cr.*
City Bridewell Fund in hands of Treasurer, ...	$26,525 69	
Kavanagh & Merriman,.........................	1,700 00	
City Bridewell Bonds, 7%,.....		$31,000 00
John M. Van Osdel,...............	2,000 00	
Discount on City Bridewell Bonds,..	725 00	
City Bridewell miscellaneous expenses,....	49 31	
	$31,000 00	$31,000 00

CITY BRIDEWELL FUND.

STATEMENT showing the Cash Receipts, and detailed account of work done under the charge of the Board of Public Works, during the year ending March 31st, 1869:

RECEIPTS.

Proceeds of 31 Municipal Bonds,	$30,275 00

EXPENDITURES.

		Cash Payment.	True Cost.
KAVANAGH & MERRIMAN.			
Paid them on account of contract,		$1,700 00	$1,700 00
JOHN M. VAN OSDELL, ARCHITECT.			
Paid him on account,		2,000 00	2,000 00
MISCELLANEOUS EXPENDITURES.			
Use of Carriage,	$ 8 00		
Advertising for proposals,	21 31		
Surveying,	20 00		
		49 31	49 31
Total cash expenditures,		$3,749 31	$3,749 31
Balance in hands of Treasurer April 1st, 1869,		26,525 69	
		$30,275 00	

WASHINGTON STREET TUNNEL.

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WORKS, MARCH 31ST, 1869.

	Dr.	*Cr.*
Washington Street Tunnel Fund, am't due Treasurer, ...		$30,578 79
Washington Street Tunnel, Miscellaneous Expenses, ...	$60,280 36	
J. K. Lake, Contractor,................	333,832 02	
Stewart, Ludlam & Co., Contractors,...	20,584 57	
Washington Street Tunnel Bonds, ...		400,000 00
Discount on Washington Street Tunnel Bonds,............................	15,881 84	
	$430,578 79	$430,578 79

TUNNEL FUND.

STATEMENT showing the cash receipts and detailed account of work done under the charge of the Board of Public Works, during the year ending March 31st, 1869.

RECEIPTS.

Proceeds 245 municipal bonds,.........	$238,013 34	
Am't paid Ass't Harbor Master, refunded,	100 00	
Voucher canceled,...........	17 50	
	$238,130 34	
Balance in hands of City Treasurer, April 1st, 1868,....................	$20,799 68	
		$258,930 02

EXPENDITURES.

		Cash Payment.	True Cost.
JAMES K. LAKE & CO.			
Paid them on account of contract,......		$257,216 64	$333,832 02
ADD—			
Payments prior to April 1st, 1868,....	$76,615 38		
MISCELLANEOUS EXPENDITURES.			
Iron fence around tunnel approaches,...	$3,500 00		
Inspectors,............................	5,102 63		
Labor,.................................	5,440 15		
Mastic and Asphaltum,.................	4,260 84		
Gas fitting,...........................	1,889 75		
Rent of dock,..........................	2,975 00		
Salary of assistant engineer,...........	2,383 33		
Salary of draughtsman, ...	1,399 92		
Amounts carried forward,........	$26,951 62	$257,216 64	$333,832 02

			Cash Payment.	*True Cost.*
Amounts brought forward,		$26,951 62	$257.216 64	$333,832 02
Salary of assistant harbor master,		1,725 80		
Constructing walks, stairs, etc.,		850 55		
Taps,		49 20		
Raising gas pipe,		237 50		
One tablet,		75 00		
Lanterns, oil cans, wicks, etc.,		83 90		
Advertising,		21 38		
Lead,		21 83		
Sewerage pipe,		29 07		
Constructing wall,		67 50		
Coal,		28 00		
Horse keeping,		41 66		
Removing iron railing,		15 00		
Lumber,		35 00		
Tools,		15 08		
Freight,		776 18		
Iron,		172 44		
Stationery,		6 00		
Cement,		476 57		
Dredging,		129 78		
Lithographing 200 bonds,		264 30		
Plumbing,		172 54		
Express on bonds,		33 60		
Telegrams and miscellaneous items,		13 17		
			32,292 67	
ADD—				
Expenses prior to April 1st, 1868,	$28,105 19			
Amount paid to Stewart, Ludlam & Co.,	20,584,57	48,689 76		
DEDUCT—				
Salary of harbor master refunded,	$100 00			
Voucher canceled,	17 50	117 50		
		$48,572 26		80,864 93
Total cash expenditures,			$289,509 31	$414,696 95
Deduct from true cost column amount of payments prior to April 1st, 1868,				$125,305 14
Total true cost for year ending April 1st, 1869,				$289,391 81

CITY DEPARTMENT.

TRIAL BALANCE, LEDGER, BOARD OF PUBLIC WORKS, MARCH 31ST, 1869.

	Dr.	*Cr.*
City Appropriation Fund,	$385,118 97	
North Division,		$5,299 22
South Division,	1,890 66	
West Division,	12,828 41	
City office expenses,	49,823 73	
North Division sidewalks,		5,358 96
South Division sidewalks,		3,332 60
West Division sidewalks,		6,310 64
Public Parks,		14,667 63
Street Lamps, West Division,		55 73
Washington Street Tunnel,	245 00	
Public Buildings,		14,314 70
Chicago Cemetery,		4,731 56
Sidewalk west side of Cemetery,		156 29
Lumber account,	740 00	
House moving and street permits,		11,374 37
Street Lamps,		4,071 89
Public Hydrants,		786 88
Stone account,	414 79	
Samuel Polkey, R. C.,	308 12	
Warrant No. 480,		308 12
City Proportional Expense account,		5,159 48
House numbers,		1,826 53
Public Benefits,		286,649 84
Special appropriation for land damages,		15,000 00
Bridge Department.	6,094 60	
Chicago Harbor,	7,609 46	
Western Avenue Bridge,		600 00
Polk Street Bridge,		29,548 14
Indiana Street Bridge,		25,500 00
Adams Street Bridge,		30,830 00
Lake Shore Roadway,	808 84	
	$465,882 58	$465,882 58

Board of Public Works Appropriation Fund.

Statement of the cash receipts by the Board of Public Works from April 1st, 1868, to March 31st, 1869, inclusive, and detailed statement of the cost of various operations conducted by the Board during the same time.

RECEIPTS.

Amount Appropriated by Common Council,......	$928,087 27	
Amount of Temporary Loan for new bridges, and running expenses,........................	256,407 22	
Permits issued,................................	5,720 00	
Received from house numbers,..................	655 50	
Received from sand sold,......................	66 55	
Damages to bridges,...........................	324 80	
Lamp posts,...................................	144 75	
Received from special assessments for expenses,..	7,168 22	
Repaving streets and repairing walks, ...	420 15	
Received for work for Fire Department,..........	1,487 87	
Received for license and scale permits,...........	39 75	
Received for labor from private parties,..........	30 50	
Repairs on Wells street viaduct,.................	400 00	
Received for labor and inspection refunded, ...	66 00	
Received for constructing walks, ...	240 12	
Received for freight on sweeping machine,.......	112 00	
Lumber sold, ...	70 81	
Stone sold, ...	18 00	
Received from J. Anderson & Co., contract forfeit,	200 00	
Received from bonds and licenses,...............	9 00	
Received from cleaning alleys in South Division,..	11 00	
Carpet sold,....	5 00	
Stationery sold, ...	3 00	
Received from marine insurance,................	12,908 73	
	$1,214,596 24	
Balance in hands of City Treasurer, April 1st, '68,	178,534 69	
		$1,393,130 93

EXPENDITURES.

		Cash Payment.	*True Cost.*
NORTH DIVISION.			
Labor on streets,	$33,087 64		
Lumber,	4,279 36		
Stone and gravel,	3,114 88		
Nails and spikes,	384 98		
Cleaning streets,	3,371 08		
Tools,	231 58		
Engineers and rodmen,	1,079 66		
Blacksmith work,	21 85		
Interest on temporary loans,	1,393 43		
Use of dock,	47 50		
Sand sold,	40 00		
		$47,051 96	
DEDUCT—			
Amount received from labor,	$912 14		
Lumber sold,	70 81		
Sand sold,	40 00	1,022 95	$46,029 01
SOUTH DIVISION.			
Labor on streets,	$43,326 04		
Cleaning streets,	25,889 38		
Lumber,	6,405 61		
Stone and gravel,	17,095 23		
Engineer and rodman,	1,815 56		
Freight on gravel and lumber,	1,262 80		
233 bbls. composition,	1,539 00		
Nails and spikes,	790 75		
Street sprinkling,	293 34		
One steam engine and saw,	600 00		
Sawing paving blocks,	275 40		
Tools,	280 26		
Repairing tools,	56 95		
Felt and roofing,	41 00		
Moving house on Wallace street,	90 00		
Horse feed,	37 33		
One tar kettle wagon,	65 00		
Damages to horse,	15 00		
Car fares,	25 00		
Interest on temporary loans,	2,786 86		
		102,690 51	
Amounts carried forward,		$149,742 47	$46,029 01

			Cash Payment.	*True Cost.*
Amounts brought forward,.......			$149,742 47	$46,029 01
DEDUCT—				
Amount received for labor,..	$616 75			
Gravel sold,................	71 10			
Freight on sweeper,........	112 00			
		799 85		
				101,890 66
WEST DIVISION.				
Labor on streets,.......................		$83,945 59		
Cleaning streets,.......................		4,574 17		
Lumber,............................		13,173 51		
Stone and gravel,......................		5,542 17		
Engineer and rodman,..................		1,248 73		
Nails and spikes,......................		1,479 50		
Tools,...............		253 03		
Use of dock,..........................		73 00		
Lamp posts,..........................		68 00		
Lamp posts broken,.......		35 00		
Horse keeping, ...		26 82		
Freight on lumber,....................		14 00		
Car fares, ...		7 00		
Interest on temporary loans, ...		2,786 86		
			113,227 38	
DEDUCT—				
Amount received for two lamp posts,..		$68 00		
Lamp post broken,..................		35 00		
Labor, ...		295 97		
		$398 97		112,828 41
SIDEWALKS, NORTH DIVISION.				
Constructing walks,....................		$255 25		
Salary of superintendent,..............		400 00		
Salary of inspectors,....		1,800 00		
Printing notices,.......................		16 00		
Public benefits, ...		6 05		
Stationery,.......		26 00		
Map of Chicago,.......................		3 10		
Advertising,..........................		14 10		
			2,520 50	
DEDUCT—				
Amount received for constructing walk,		$58 15		2,462 35
Amounts carried forward,........			$265,490 35	$263,210 43

		Cash Payment.	*True Cost.*
Amounts brought forward,		$265,490 35	$263,210 43
SIDEWALKS, SOUTH DIVISION.			
Constructing walks,	$888 49		
Salary of superintendent,	400 00		
Salary of inspectors.	2,700 00		
Advertising and printing notices,	30 10		
Stationery,	26 15		
Public benefits,	52 12		
		4,096 86	
DEDUCT—			
Amount received for constructing walks,	$59 20		4,037 66
SIDEWALKS, WEST DIVISION.			
Constructing walks,	$1,564 01		
Salary of superintendent,	400 00		
Salary of inspectors.	3,328 89		
Printing and stationery,	44 00		
Public benefits,	32 67		
Advertising,	14 42		
Map of Chicago,	6 75		
		5,390 74	
DEDUCT—			
Amount received for constructing walks,	77 18		5,313 56
LAKE PARK.			
Dirt used for filling,	$6,214 20		
Labor,	1,801 80		
Superintendent,	500 00		
Inspectors,	941 13		
Cost of fence,	613 18		
Cost of walk,	561 63		
36 lamp posts,	1,224 00		
Advertising,	31 00		
Hardware,	5 70		
Grass seed,	20 20	11,912 84	11,912 84
JEFFERSON PARK.			
Constructing walk,	$423 78		
Removing walk,	40 00		
Labor,	93 50		
		557 28	
Amounts carried forward,		$287,448 07	$284,474 49

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$287,448 07	$284,474 49
DEDUCT—			
Amount received for removing walk,..	40 00		517 28
DEARBORN PARK.			
62 trees,.......	112 00		
Labor, ...	81 25		
Making plans for fountain,..............	21 00	214 25	214 25
PUBLIC PARKS.			
Fencing Union square,.......		134 10	134 10
WASHINGTON PARK.			
Constructing walks,.....................	879 50		
Labor, ...	87 12	966 62	966 62
UNION PARK			
Labor, ...	9,341 82		
Excavating lakes,....	2,103 93		
Ashes, ...	265 75		
Trees,..................................	668 20		
Macadam,...............................	533 77		
Bridges constructed,...................	6,413 18		
Superintendent, ...	350 00		
Inspector,..............................	75 00		
Advertising,............................	69 76		
Fifteen signs, ...	22 50		
Grass seed,.............................	105 50		
Tools,....	46 75		
Nails,..................................	14 25		
Lumber, ...	45 38		
Painting fence,......................	600 00		
		20,655 79	
DEDUCT—			
Labor refunded,.................. .	66 00		20,589 79
LINCOLN PARK.			
Drives and walks,...........	$15,918 06		
Transplanting trees,....................	1,931 25		
Amounts carried forward, ...	$17,849 31	$309,418 83	$306,896 53

		Cash Payment.	*True Cost.*
Amounts brought forward, ...	$17,849 31	$309,418 83	$306,896 53
Sewer on Asylum place, ...	1,083 56		
Settees, ...	427 10		
Damages, ...	300 00		
Labor, ...	988 48		
Superintendent, ...	350 00		
Flag staff, ...	312 00		
Bridges repaired, ...	216 18		
Freight on swans, ...	78 00		
Lumber, ...	55 20		
Advertising, ...	38 50		
One mower, ...	35 00		
Music stands, ...	66 50		
Gate tender, ...	50 00		
		21,849 83	21,849 83
PUBLIC BUILDINGS—ARMORY.			
Walk approaches, ...	$213 70		
Carpenter and mason work, ...	43 50		
Lightning rod, ...	23 75		
Painting and glazing, ...	749 10	1,029 75	1,029 75
NORTH MARKET.			
Carpenter work, ...	$45 67		
Repairs, ...	3,997 75		
		4,043 42	4,043 42
BRIDEWELL.			
Carpenter work, ...	$59 93		
Lumber, ...	70 50		
Nails, ...	36 50		
Iron work, ...	5 60		
Tools, ...	17 20		
Gas fitting, ...	19 72		
		209 45	209 45
COURT HOUSE.			
Reglazing cupola, ...	$4 78		
Repairs, ...	52 00		
Plumbing, ...	6 95		
		63 73	
DEDUCT—			
Lumber and nails, ...	$9 90		
			53 83
Amounts carried forward, ...		$336,615 01	$334,082 81

		Cash Payment.	*True Cost.*
Amounts brought forward,		$336,615 01	$334,082 81
CHICAGO CEMETERY.			
Fencing grounds above city limits,	$515 85		
Salary of gate keeper,	900 00		
Watching sand,	179 00		
Lumber,	12 17	1,607 02	
DEDUCT—			
Sand sold,	$26 55		1,580 47
LUMBER ACCOUNT.			
Lumber purchased not used,		110 00	110 00
HOUSE MOVING AND STREET PERMITS.			
Special constables,	$1,715 98		
Permit clerk,	300 00		
Permits not used,	10 00		
Printing blanks,	30 00		
Horse feed,	4 15	2,060 13	
Received for permits, $5,719 00			
STREET LAMPS.			
Error in assessment on Park Avenue,	$10 62		
Deficiency on warrant 509,	183 00		
Public benefits,	1,584 29	1,777 91	
DEDUCT—			
Refunded for lamp,	$41 75		1,736 16
PUBLIC HYDRANTS			
Hydrants,	$177 82		
Labor,	11 68		
Repairs,	20 52		
One tap	3 10	213 12	213 12
Amounts carried forward,		$342,383 19	$337,722 56

		Cash Payment.	True Cost.
Amounts brought forward,.......		$342,383 19	$337,722 56
CHICAGO HARBOR.			
Dredging,..............................	$76,897 40		
Salary of Harbor Master, ...	1,601 96		
Repairing dock,........................	1,630 38		
Labor, ...	1,337 48		
Use of Tugs,...........................	376 00		
Advertising,...........	49 88		
Lumber,................................	87 51		
Oil, ...	29 75		
Keeper of light house,.................	86 02		
Wagon for City Engineer,...............	75 00		
Removing obstructions, south branch,....	201 05		
Painting life boat, ...	33 20		
		82,405 63	82,405 63
STONE ACCOUNT.			
Stone purchased not used,...............		$432 79	$432 79
HOUSE NUMBERS.			
Printing blanks,.................... ..	$18 00		
Painting numbers,......................	32 00		
Number clerk, ...	253 84		
		303 84	
Received for numbers,.......... $655 50			
BRIDGE DEPARTMENT.			
Carpenter work,........................	$12,857 84		
Lumber, ...	4,877 12		
Driving piles and use of scow,...........	2,281 06		
Salary of Assistant Superintendent,......	1,853 14		
Painting bridges, ...	1,016 40		
Oakum and rope,........................	112 85		
Coal used,.............................	463 75		
Piles, ...	779 84		
Castings,..............................	277 70		
Lamps, lanterns, chimneys and wicks,....	283 83		
Lard oil and kerosene, ...	487 94		
Stone,.......	44 54		
Nails and spikes,......................	623 37		
Blacksmith work, ...	798 26		
Bridge house repairs,..................	162 15		
Amounts carried forward,........	$26,919 79	$425,525 45	$420,560 98

		Cash Payment.	*True Cost.*
Amounts brought forward,	$26,919 79	$425,525 45	$420,560 98
Hardware,	31 18		
Bells,	14 00		
Iron,	28 62		
Horse keeping,	103 91		
Chain,	317 76		
Advertising,	138 64		
Clocks,	78 00		
Gas fitting and fixtures,	24 24		
Stoves and fixtures,	70 43		
Use of tugs,	99 00		
Tools,	137 91		
		27,963 48	
DEDUCT—			
Amount received for damages,	$324 80		27,638 68
RUSH STREET BRIDGE.			
Tending bridge,	$2,300 00		
Castings,	223 39		
Bell,	8 00		
		2,531 39	2,531 39
STATE STREET BRIDGE.			
Tending bridge,	$1,960 00		
Lumber,	318 43		
Nails,	61 50		
Damages,	527 25		
		2,867 18	
DEDUCT—			
Amount received for repairs on viaduct,	$400 00		2,467 18
CLARK STREET BRIDGE.			
Tending bridge,		1,940 00	1,940 00
WELLS STREET BRIDGE.			
Tending bridge,	$1,940 00		
Piles and driving same,	995 90		
Four lamps on viaduct,	60 00		
		2,995 90	2,995 90
Amounts carried forward,		$463,823 40	$458,134 13

		Cash Payment.	*True Cost.*
Amounts brought forward,.......		$463,823 40	$458,134 13
LAKE STREET BRIDGE.			
Temporary loan,..........	$6,800 00		
Interest on temporary loan,.............	287 86		
Labor and material,.......	634 89		
Piles and driving same,.................	886 00		
Tending bridge, ...	1,860 00		
		10,468 75	10,468 75
RANDOLPH STREET BRIDGE.			
Tending bridge,.......................	$1,610 00		
Driving piles,........................	727 10		
White-washing and plastering bridge house,	38 00		
		2,375 10	2,375 10
MADISON STREET BRIDGE.			
Tending bridge,.......................	$1,700 00		
Driving piles,........................	1,513 70		
Lumber,................................	265 80		
Repairs of abutment,..................	21 30		
		3,500 80	3,500 80
VAN BUREN STREET BRIDGE.			
Tending bridge,.......................		$1,660 00	1,660 00
THROOP STREET BRIDGE.			
Fox & Howard, constructing bridge,.....	$12,649 70		
Tending bridge,.......................	190 00		
		12,839 70	12,839 70
POLK STREET BRIDGE.			
Tending bridge,..........	$1,600 00		
Use of tug,...........................	12 00		
Driving piles,...	229 30		
Repairing bridge, ...	210 56		
		2,051 86	2,051 86
Amounts carried forward,.................		$496,719 61	$491,030 34

		Cash Payment.	*True Cost.*
Amounts brought forward,		$496,719 61	$491,030 34
TWELFTH STREET BRIDGE.			
Fox & Howard, constructing bridge,	$44,499 40		
Inspector,	253 75		
Tending bridge,	1,600 00		
		46,353 15	46,353 15
HALSTED STREET BRIDGE.			
Tending bridge,		1,460 00	1,460 00
EIGHTEENTH STREET BRIDGE.			
Fox & Howard, balance for construction,	$1,000 00		
Labor and material,	167 25		
Repairs,	23 64		
Three lamp posts,	81 00		
Damages by bridge,	48 48		
Tending bridge,	1,600 00		
		2,920 37	2,920 37
ARCHER ROAD BRIDGE.			
Tending bridge,		520 00	520 00
FULLER STREET BRIDGE.			
Tending bridge,		520 00	520 00
REUBEN STREET BRIDGE.			
Tending bridge,		380 00	380 00
KINZIE STREET BRIDGE.			
Tending bridge,		1,580 00	1,580 00
DIVISION STREET BRIDGE.			
Fox and Howard, constructing bridge,	$15,500 00		
Advertising proposals,	19 38		
Extra work,	673 15		
		16,192 53	16,192 53
INDIANA STREET BRIDGE.			
Tending bridge,	$1,460 00		
Fox & Howard, constructing bridge,	3,500 00		
		4,960 00	4,960 00
Amounts carried forward,		$571,605 66	$565,916 39

		Cash Payment.	*True Cost.*
Amounts brought forward,		$571,605 66	$565,916 39
ERIE STREET BRIDGE.			
Tending bridge,		1,380 00	1,380 00
CHICAGO AVENUE BRIDGE.			
Fox & Howard, balance for construction,	$532 00		
Piles and driving same,	442 22		
Painting,	52 42		
Cement,	12 50		
Repairing walk,	72 25		
Tending bridge,	1,380 00		
		2,491 39	2,491 39
NORTH AVENUE BRIDGE.			
Tending bridge,		780 00	780 00
CLYBOURN AVENUE BRIDGE.			
Tending bridge,		520 00	520 00
NORTH HALSTED BRIDGE.			
Tending bridge,		940 00	940 00
OFFICE EXPENSES AND SALARIES.			
Salary of Commissioners,	$3,000 00		
Salary of Secretary and assistant,	1,399 96		
Salary of City Engineer,	1,500 00		
Salary of Superintendent,	933 32		
Salaries of bookkeepers and clerks,	3,449 65		
Salaries of assistant engineers,	6,436 41		
Salaries of draughtsmen,	6,672 60		
Salaries of special assessment clerks,	11,646 64		
Salaries of messenger, janitor & watchman,	754 00		
Temporary loans,	256,407 22		
Interest on same,	362 50		
Advertising,	9,182 97		
Rent of office,	2,250 00		
Examining records,	50 00		
Carpenter work,	229 90		
Repairs,	43 59		
Gas,	83 29		
Amounts carried forward,	$304,402 05	$577,717 05	$572,027 78

		Cash Payment.	*True Cost.*
Amounts brought forward,.......	$304,402 05	$577,717 05	$572,027 78
Printing Sixth Annual Report,..........	164 77		
Commissioners' oaths,...	161 50		
Police badges,....................	7 33		
Stationery and blank books,............	604 76		
Repairing surveyor's instruments,.......	30 00		
Furniture, carpets and mats,............	283 05		
Ventilators,.........................	15 11		
Revenue stamps,......................	133 34		
Excess in costs of proceedings,..........	43 63		
Towels,.............................	6 66		
Lumber,............................	34 85		
Scale permit not used, ...	6 00		
Maps of Chicago, ...	32 00		
Use of carriage,......................	1 66		
Drawing materials,....................	68 53		
Copies of objections to special assessments,	125 00		
Street sprinkling,......................	14 66		
Gas fixtures and fitting,................	10 40		
Auctioneer's license,..................	6 67		
Sundry cash items,....................	89 18		
Printing, ...	592 56		
Horse feed, ...	176 19		
Coal,...............................	203 98		
Ice,............................... ..	26 85		
Reporting sundry cases,................	150 00		
Washing towels and cleaning office,......	144 10		
Hardware,..........................	76 74		
		307,611 57	
DEDUCT—			
Amount received for temporary loans,	$256,407 22		
Cost of proceedings on sundry assessm'ts	7,168 22		
Contract forfeit of J. Anderson & Co.,..	200 00		
Surveyor's license, ...	39 00		
Scale permits,.......................	15 75		
Blank books,........................	3 00		
Labor,.............................	50		
	$263,833 69		43,777 88
INTERSECTIONS OF STREETS.			
Paving intersections of Jefferson street,..	$367 83		
“ “ Kinzie street, ...	435 62		
“ “ Halsted street,....	4,272 50		
“ “ North Clark st.,.	7,296 64		
Amounts carried forward,........	$12,372 59	$885,328 62	$615,805 66

		Cash Payment.	*True Cost.*
Amounts brought forward,.......	$12,372 59	$885,328 62	$615,805 66
Paving intersections of South Clark st.,..	1,401 24		
“ “ Division street, ..	644 71		
“ “ Michigan street,..	11,302 53		
“ “ North State street,	8,036 39		
“ “ Blue Island av., ..	6,709 59		
“ “ North Wells st.,..	7,168 60		
“ “ Prairie av.,.......	2,105 52		
“ “ Michigan av.,.....	109 60		
“ “ 22d street,.......	5,562 83		
“ “ 12th street, ...	298 16		
“ “ Franklin street,..	4,362 33		
Macadamizing intersection Chicago av.,..	18,430 81		
“ “ Jefferson st.,..	725 85		
“ “ Blue Island av.	6,500 00		
Filling intersections Bremer street,......	1,699 18		
“ “ Jefferson street,.....	10 80		
“ “ Alleys in B. 47, S. S.,	24 00		
“ “ W. Adams street,....	1,919 82		
“ “ W. Washington st.,..	339 20		
Planking alleys in O. T.,................	261 91		
Opening sundry alleys,................	597 46		
Damages,............................	500 00		
Wells street viaduct,....................	4,500 00		
Lumber,............................	211 33		
Labor,.............................	7,145 73		
Cement, ...	1,136 25		
Inspector,............................	56 25		
Improving Calhoun place,..............	130 62		
Curb cor. N. State st. and Chicago av.,...	48 75		
Surveying Halsted street,..............	10 00		
Sewerage pipe,........................	18 60		
Deficiency in extending La Salle street,..	435 27		
Public benefits, ...	58 55		
Filling intersect'n of Adams & Desplaines,	12 25		
Paving intersection North Wells street,..	6,772 76		
“ “ Halsted street,......	11,099 86		
		122,719 34	
DEDUCT—			
Curbing cor. North State & Chicago av.,	$48 75		122,670 59
Total cash expenditures,..........		$1,008,047 96	$738,476 25
Balance in Treasurer's hands April 1st, 1869,		$385,118 97	
		$1393,166 93	

RECAPITULATION.

Amount expended for Water Fund, ...	$696,914 75
Amount expended for Sewerage Fund,.............	468,946 23
Amount expended for River Improvement Fund,...	537,401 54
Amount expended for City Bridewell Fund,........	3,749 31
Amount expended for City Hall Fund,.............	21,587 60
Amount expended for Washington st. Tunnel Fund,	289,509 31
Amount expended for Appropriation Fund,........	1008,047 96
Total cash expenditures from April 1st, 1868, to March 31st, 1869,............................	$3,026,156 70

Respectfully submitted,

E. M. JOHNSON,

Bookkeeper.

TD
25
C5
A3
8th (1869)
RARE
BK RM

PFC 29